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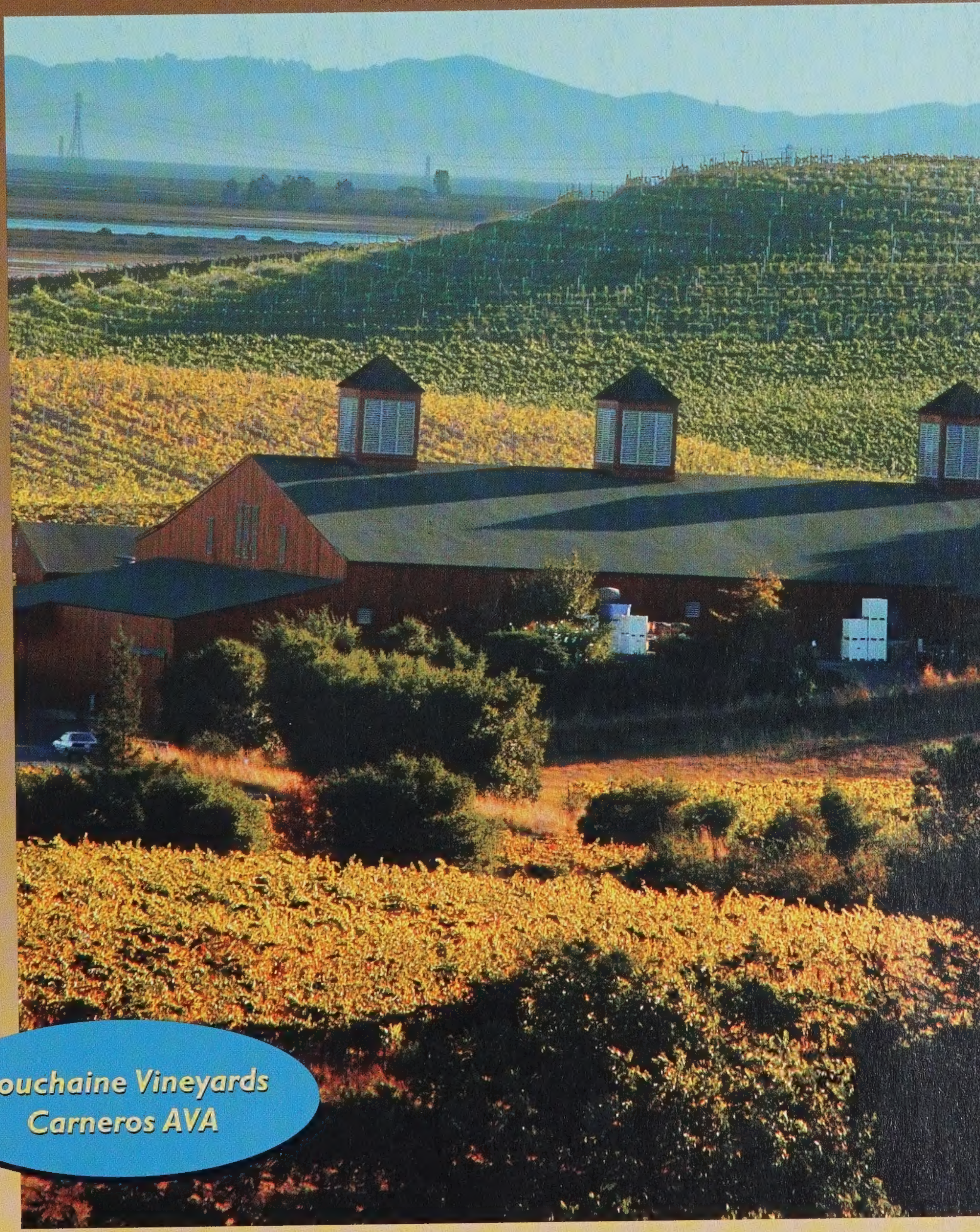
Terroir reconsidered



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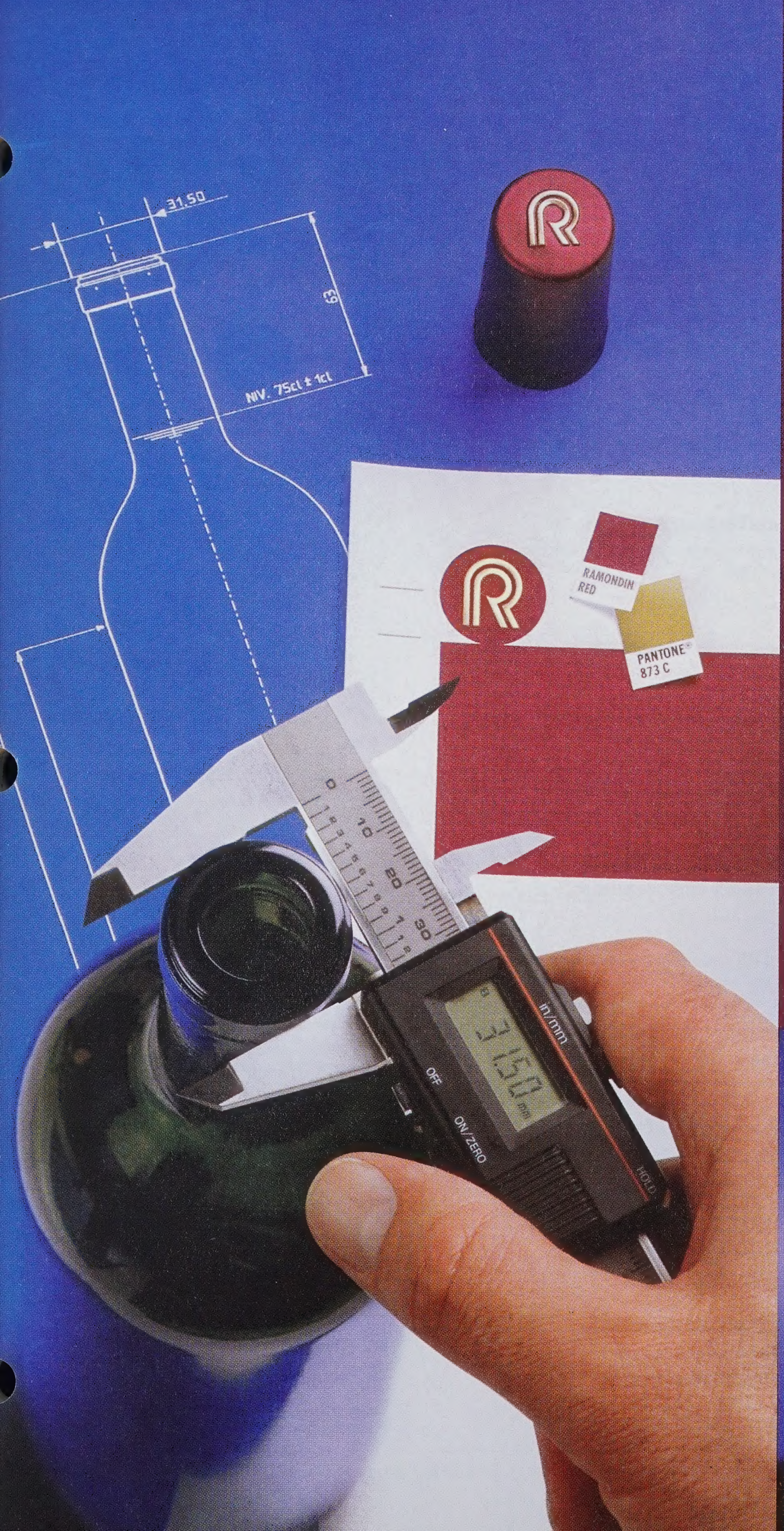

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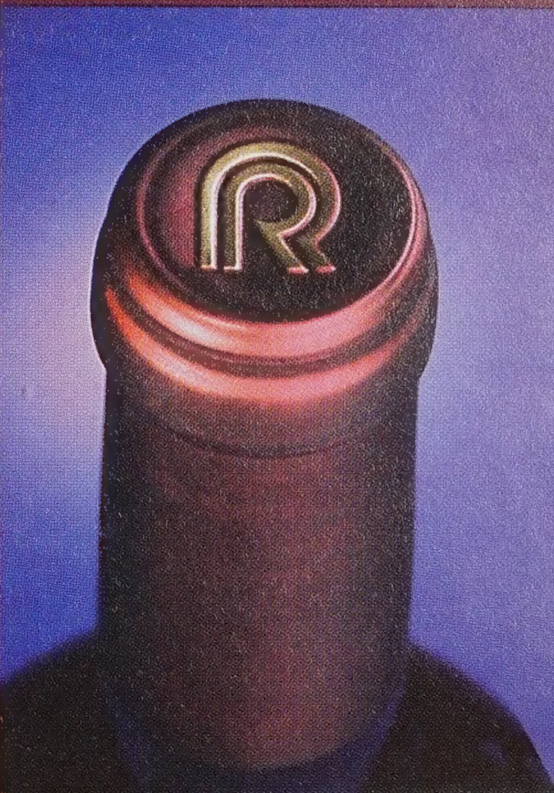

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Lodi Rules certification advances sustainable winegrowing

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What are *The Lodi Rules for Sustainable Winegrowing*? They are the first sustainable winegrowing standards in California that have been peer-reviewed by scientists, academics, and environmentalists, and endorsed by Protected Harvest.

Participating growers believe that implementation of *The Lodi Rules* will enable them to produce higher quality wine-grapes (and thereby higher quality wines), improved soil and water quality, and a safer working environment for winegrowers and vineyard workers.

The global wine industry gets more competitive every day and the ability to differentiate one's wine in the marketplace is a key to financial success. Building on a long history of implementing integrated pest management (IPM) and other sustainable farming practices in their vineyards, Lodi winegrowers have developed a certification program based on the *Lodi Winegrower's Workbook*. The goal of this program is to aid the district's growers and vintners to differentiate and add value to their winegrapes and wines based on how the grapes are grown.

Differentiating a food or beverage from others in the marketplace based on how it is grown or produced is not new. Organic and biodynamic farmers have done that for decades. However, The Lodi Rules program is a new model, one promoted by Protected Harvest, a third-party, non-profit organization that certifies farmers' use of stringent environmental farming standards.[1]

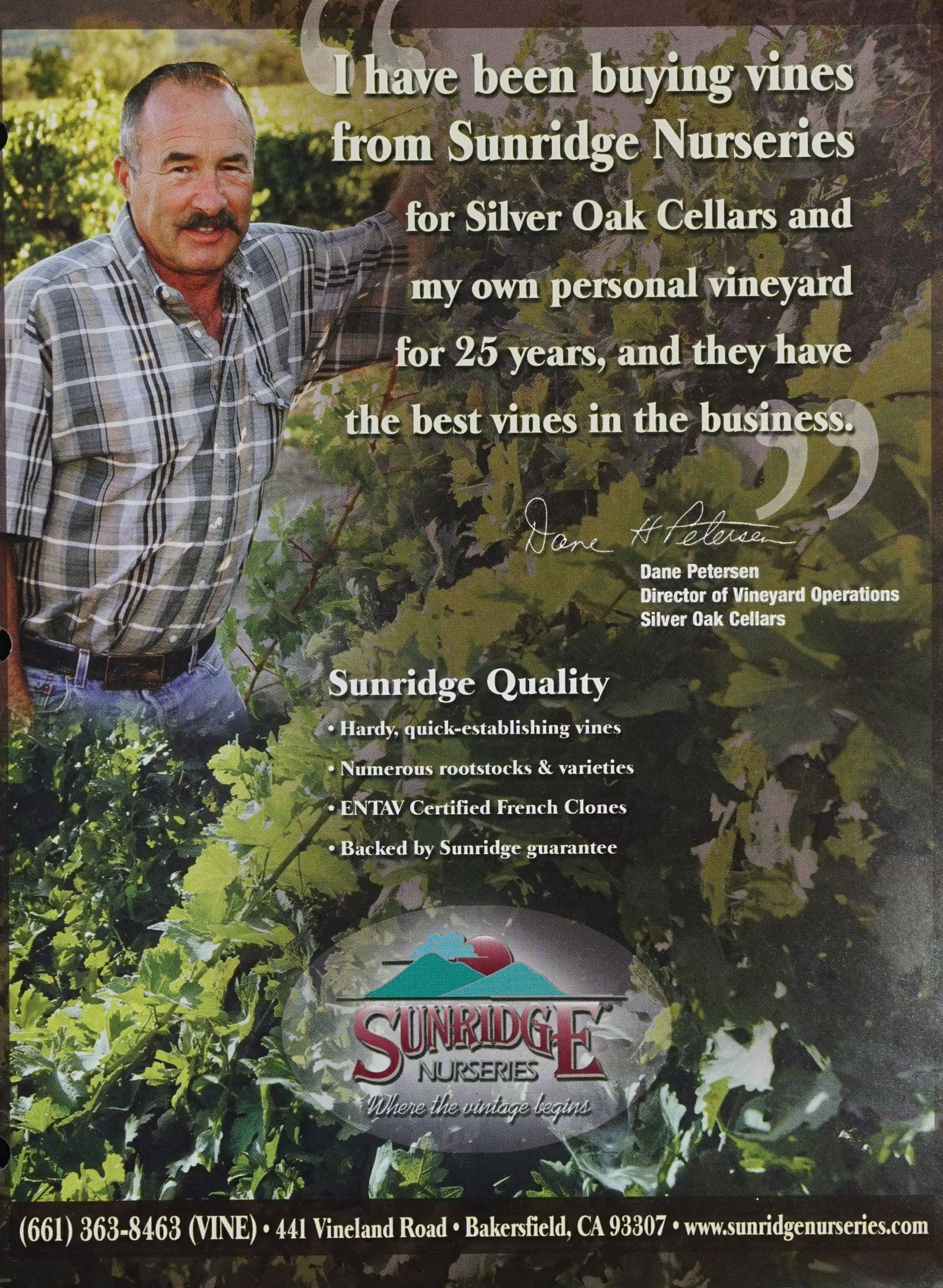
Markus Bokisch's Syrah vineyard near Clements, CA, with a wall-to-wall cover crop of rye grass and resident vegetation. (Photo by Dale Goff)

The Lodi Rules program is open to all Lodi-Woodbridge Winegrape Commission (LWWC) growers on a voluntary basis. It supports LWWC's goals of improving Lodi's reputation for producing high quality winegrapes and wine. Growers who choose to participate in the program can have their vineyards certified as producing sustainably-grown winegrapes. Wineries making wine from these grapes can then use the certification in their marketing programs.

History of The Lodi Rules

EXISTING CERTIFICATION PROGRAMS

In early 2000, the LWWC published *The Lodi Winegrower's Workbook: A self-assessment of integrated farming practices*.[2] The workbook helps growers assess the level of implementation of sustainable farming practices in their



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Steve Ehlers uses drill to plant cover crop seed in a Verdelho vineyard near Lodi, CA.

vineyards and provides instructions on developing action plans to improve on specific practices where improvements are warranted.

While putting the Lodi workbook together, LWWC growers realized that it could help guide innovation in the vineyard and provide a foundation for developing a sustainable farming certification program. In April 2001, after using the workbook for one year, the growers formed a planning committee to explore the possibility of developing a certification program. Existing certifi-

Germinating cover crop of an oat, wheat barley forage mix with some peas and vetch in Steve Ehlers' Verdelho vineyard near Lodi, CA.

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cation programs were reviewed, particularly those dealing with winegrapes, including:

- South Africa's Integrated Production of Wine, a national program (established 1998) that claims to include 80% of the wineries and 95% of its vineyards as participants.[3]
- Oregon's Low Input Viticulture and Enology (Oregon LIVE, established 2001), which is certified by the International Union of Biological Control (IOBC).[4]
- Salmon Safe is a non-profit organization (established 2001) that certifies not only vineyards but also other types of farms, municipal parks, and natural areas in urban landscapes.[5]
- Food Alliance (established 1997), certifies a wide range of fruits, vegetables, dairy farms, and beef operations. Winegrapes certification is a minor part of their program.[6]
- Fish Friendly Farming is a certification program active in Napa and Sonoma counties for vineyard properties.[7]

One certification program reviewed by the committee that did not involve winegrapes was the Healthy Grown® program, which was conceived in the mid-1990s by a group of progressive Wisconsin potato growers facing serious pesticide-related challenges.[8] To set pesticide risk reduction goals and develop a way to track progress toward them, a collaboration was formed of the Wisconsin Potato and Vegetable Growers Association, the University of Wisconsin, and World Wildlife Fund.

The goals and pesticide risk measurement system developed by the Wisconsin collaboration became the foundation for the Healthy Grown program. A new organization, Protected Harvest, was created to serve as a non-profit, third-party certifier for this and

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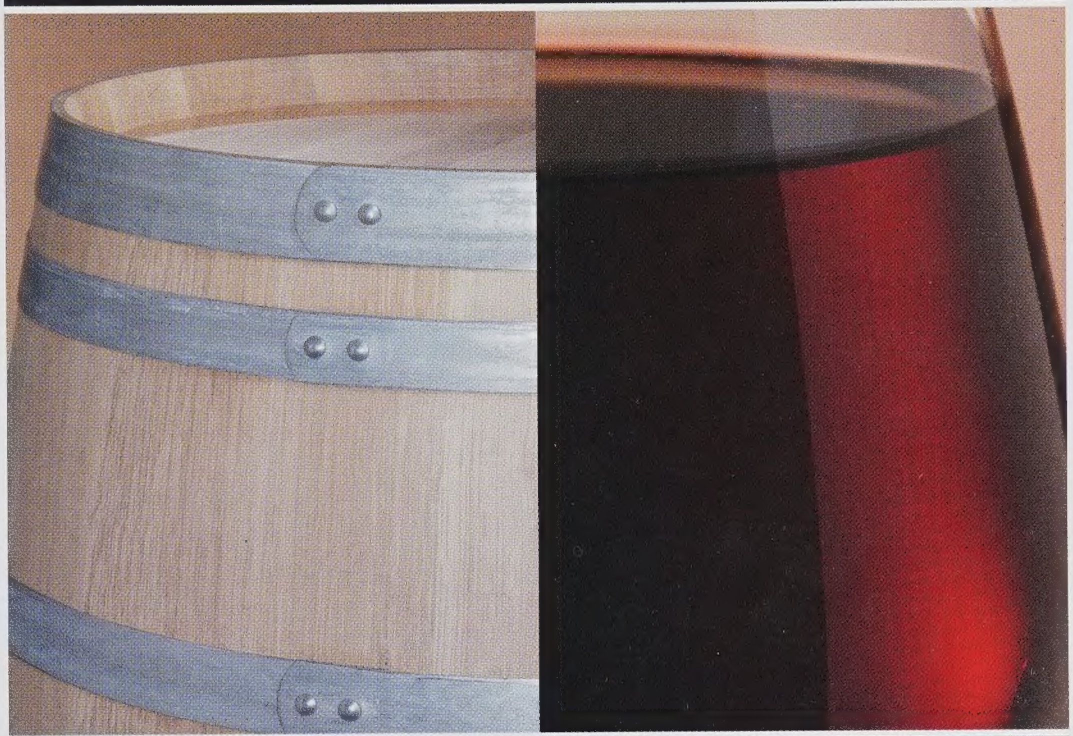

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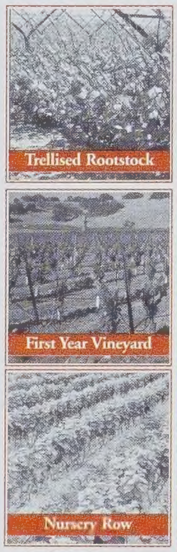

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similar programs focusing on pesticide risk reduction and the promotion of environmentally friendly farming systems.[1] Like some other certification programs reviewed, the Healthy Grown program requires growers to adopt sustainable farming practices, particularly IPM.

Participants in the Healthy Grown program emphasize that these standards have been peer-reviewed by scientists, academics, and environmentalists, a claim not made by other programs. Another unique aspect of the certification program is that the potato growers are required to use a multi-attribute pesticide impact model developed to measure the environmental impact of pesticides applied, whether synthetic or organically approved. For a potato grower to qualify for certification, pesticides applied on a field during the year cannot exceed a threshold of environmental impact units.

The LWWC grower planning committee has designed a certification program following this Healthy Grown model, because it not only requires adherence to explicit, proven IPM and other sustainable farming practices, but it also requires use of a pesticide environmental impact model.

Protected Harvest was chosen as the third-party certifier because of its rigorous peer review process of farming standards and its policy of a transparent certification process. The organization has been given the highest rating by the Consumers Union Guide to Environmental Labels.[9] Erik Olson (Senior Attorney for the Natural Resources Defense Council, which continues to strongly support organic farming), called Protected Harvest the "pre-eminent environmental third-party certifier in the U.S."

Standards for farming practices were based on the *Lodi Winegrower's Workbook* because it is the most comprehensive document available on sustainable winegrape growing practices.

Table I. Standards for farming practices in six chapters of The Lodi Rules

1. Ecosystem Management

Sustainability Vision/Plan for Farm
Watershed Management
Environmental Survey for Vineyard Site
Woodlands
Individual Tree Management
Habitat other than Trees
Vernal Pools
Riparian Habitat
Moving Water Habitat
Nest Boxes for Owl, Raptors, and Bats
Nest Boxes for Other Birds
Managing Livestock Access to Vineyard
Livestock Grazing Plan

2. Education, Training and Team Building

Human Resources Plan
Employee Orientation
Safety Training
Safety Rewards Program
LWWC and University-sponsored Professional Training and Development
Staying Informed with Wine Industry
Teambuilding for Sustainability
Employee Handbook
Employee Meetings
Salary Survey Participation
Sustainability Bonus System

3. Soil Management

Nutrition Management Plan
Soil Series
Soil Analysis for Micronutrients
Soil Analysis for Macronutrients
Plant Analysis
Monitoring Water Quality
Nitrogen Application (5 components)
Amendments for Water Penetration
Amendments for pH
Organic Matter
Tillage of Vineyard Floor
Soil Erosion/Soil Conservation Plan
Cover Cropping to Minimize Soil Erosion

4. Water Management

Type of Irrigation System
Irrigation Pumps
Offsite Irrigation Water Movement
Irrigation System Maintenance
Irrigation System Distribution Uniformity
Flow Meters
Pump Efficiency
Soil Water-holding Capacity
Irrigation Initiation and Scheduling
Water Budget
Fertigation

Table I. Standards for farming practices in six chapters of The Lodi Rules (continued)

5. Vineyard Establishment

- Soil Profile Inspection
- Soil Profile Modification
- Soil Tested for Chemical Properties
- Soil Tested for Biological Problems
- Addressing Biological Problems pre-plant
- Rootstocks
- Scion
- Grafting Vines to Change Varieties

6. Pest Management

- Monitoring for Insect, Mite, and Disease Pests
- Economic Threshold Plan
- Economic Threshold for Leafhoppers
- Economic Threshold for Spider Mites
- Prescriptive Spraying
- Dust Abatement for Mite Management within the Vineyard
- Dust Abatement for Mite Management for On-Farm Roads, Avenues, and Yards
- Dust Abatement for Mite Management for Headlands, Ditches and Roadsides
- Training of Employees for Pest Recognition
- Vineyard Sanitation for Disease Inoculum Reduction.
- Powdery Mildew Management
- Initiating Powdery Mildew Treatment
- Timing of Powdery Mildew Treatment
- Powdery Mildew Fungicide Resistance Management
- Soil-Borne Pest Management (2 components)
- Weed Management Plan (2 components)
- Vertebrate Management (3 components)
- Pesticide Application (4 components)

Development of farming standards

The LWWC formed a certification committee in November 2003 to draft standards for sustainable farming practices. It included 10 LWWC growers, two Lodi winery representatives, two pest control advisors, a wildlife biologist, two University of California (UC) Viticulture Farm Advisors, a UC Irrigation Specialist, and four LWWC staff members.

Managers of small, medium, and large vineyard operations were asked to serve on the committee to ensure that all types of Lodi growers were represented. Together, growers on the certification committee manage more than 30% of the vineyard acres in the Lodi district.

The draft standards were submitted to Protected Harvest in April 2005, which organized the peer-review and Protected Harvest Board review. The standards were revised based on reviews and given unanimous Board endorsement in May 2005.

Dr. Chuck Benbrook, Benbrook Consulting Services (BCS), was contracted to develop the pesticide impact model for the certification

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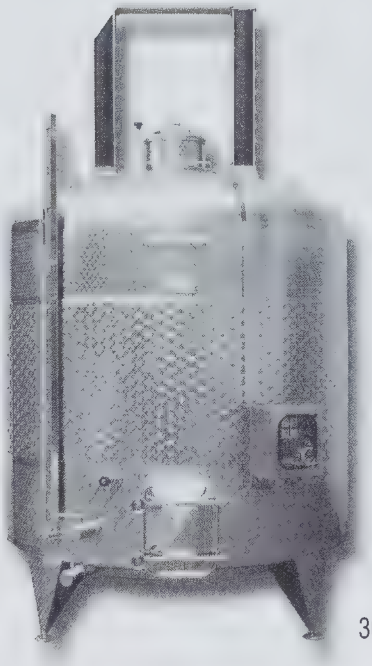

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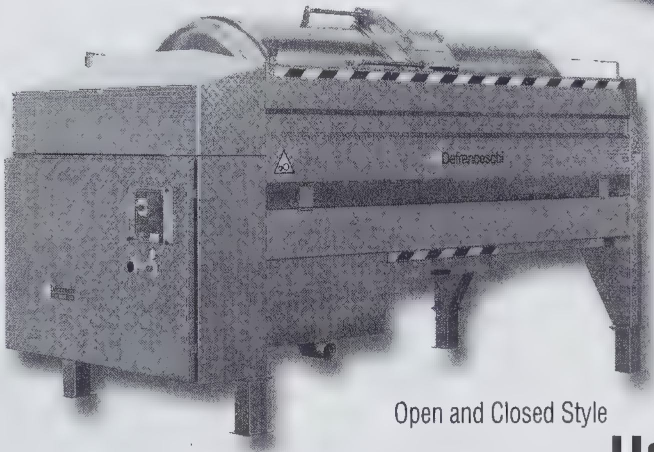

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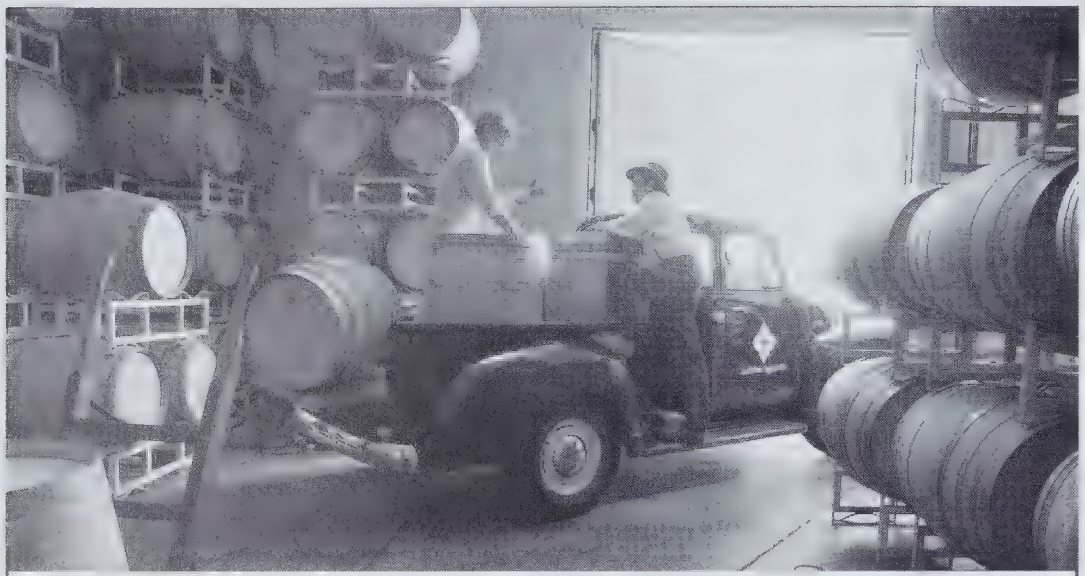
program with input from the certification committee and LWWC staff.

MARKET RESEARCH

While the farming standards were being developed, a task force of wine marketers, winery representatives, winegrape growers, LWWC staff, and consultants conducted a year-long market research project. The task force identified all important wine industry segments, from the vineyard to the consumer, developed market messaging about the certification program for each segment, and created a plan to deliver this message to each segment.



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The process involved more than 100 interviews with winegrape growers, winery representatives, wine wholesalers and distributors, retailers and specialty trade, restaurants, wine writers and educators, international wine consultants, the media, and people involved in other environmental certification programs.

Focus groups of the wine consuming public were convened in Sacramento, CA, Chicago, IL, and the Washington DC area. Participants were queried about wine purchasing behavior, reactions to environmental messages associated with wine, environmental certification programs, and their impressions of messages about Lodi wine and the growers' sustainable farming program. Analyses of these interviews and transcripts from focus groups were used to develop plans on how to deliver information about the certification program to each industry segment.

Farming practice standards of The Lodi Rules

The Lodi Rules consist of 75 farming practice-standards divided into six chapters: Ecosystem Management; Education, Training and Team Building; Soil Management; Water Management; Vineyard Establishment; and Pest Management (Table I).

A farming practice had to meet three criteria to be included as a standard:

1. It must be measurable, in other words there must be physical evidence indicating the practice was done.
2. The practice must maintain or enhance one or more of the 3E's of sustainability, those being Economic viability, Environmental soundness, and social Equity (or responsibility).
3. The practice must be technically and economically feasible and must not set an unachievable standard.

Some of the standards have two or more components because they address a complex issue, such as nitrogen application. Some practices that are very important because they have multiple uses and effects in or around

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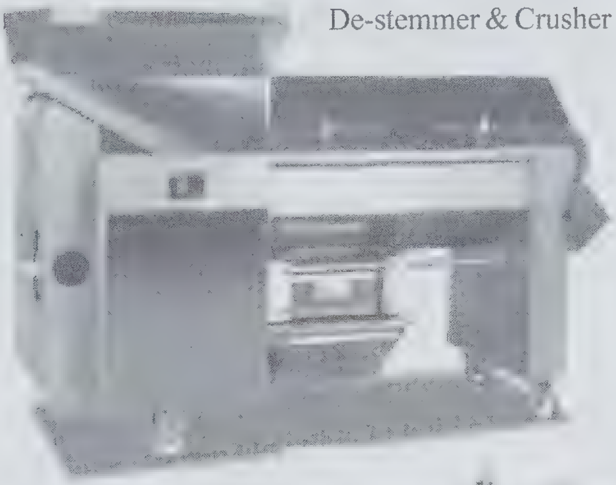

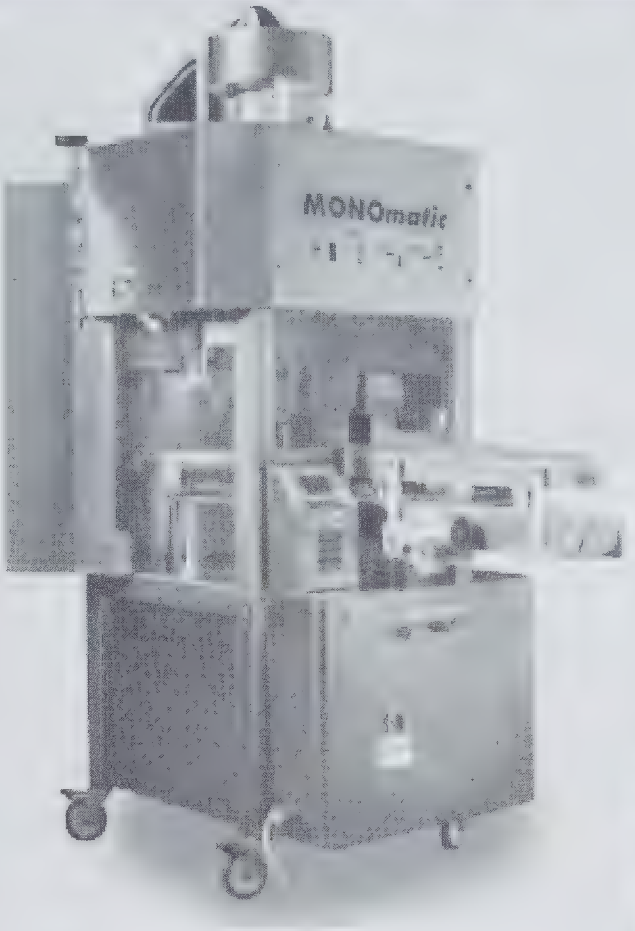

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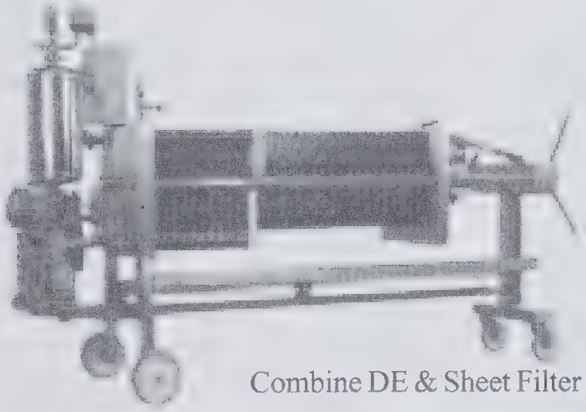

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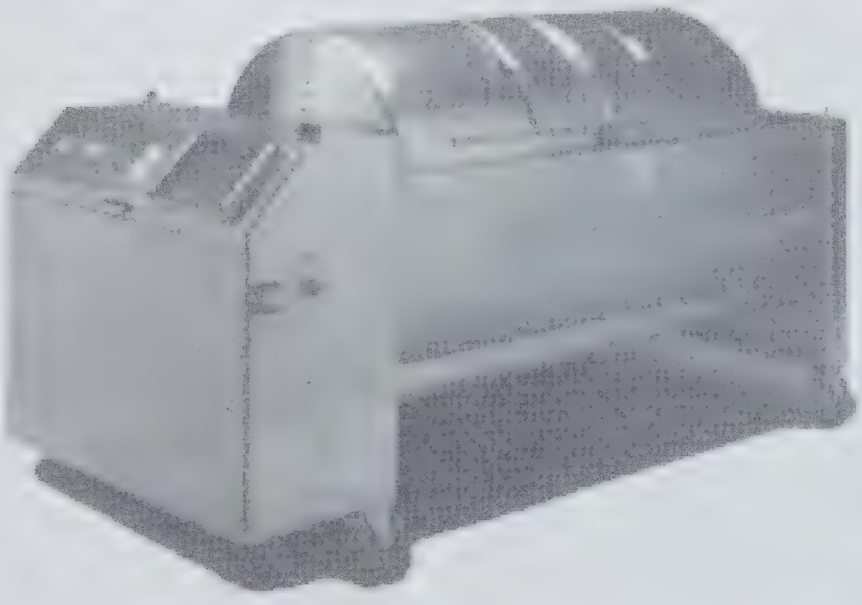

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the vineyard, such as planting of cover crops, appear in a standard in more than one chapter.

Lodi Rules farming-practice standards are in two basic forms. One form is a Yes/No question, where a "Yes" response is awarded a specified number of points. Growers answering "No" receive no points. There are 13 standards of this form in the Lodi Rules and in all cases, to answer "yes," a grower is required to have a management plan that must contain specific components relevant to the issue being addressed (Table II).

Table II. Farming standards requiring management plans

- Sustainability vision for farm
- Environmental survey and monitoring program for new or existing vineyard
- Livestock grazing plan for farm
- Human resources
- Nutrition management plan for vineyard
- Soil erosion/soil conservation
- Economic threshold plan for insect and mite pests
- Powdery mildew management
- Soil-borne pest management
- Weed management
- Vertebrate management
- Sprayer/duster maintenance
- Spray/dust drift management for vineyard

The other form addresses standards that deal with specific farming practices or issues that have three or more levels. Incrementally more points are awarded as one goes from the bottom level, (for which one obtains no points), to the top level, which is the most sustainable practice and receives maximum points. Table III contains an example of this type of standard from the Soil Management chapter.

There are 11 standards in The Lodi Rules that require a minimum level of adherence or performance to retain eligibility for certification. These aspects of the standard are called "Fail Chapter" components. If growers are at the bottom level for any "Fail Chapter" component, they fail to qualify for overall certification regardless of what they score on other standards for that chapter.

The certification committee felt that there were many farming practices where, if a grower was not doing better than the minimum for any one of them in a given vineyard, then that vineyard should not qualify for certification. Table IV contains a "Fail Chapter" standard from the Pest Management chapter.

"Fail Chapter" standards highlight one of the foundations of The Lodi Rules/Protected Harvest certification model. To obtain certification, a grower must *do* many different

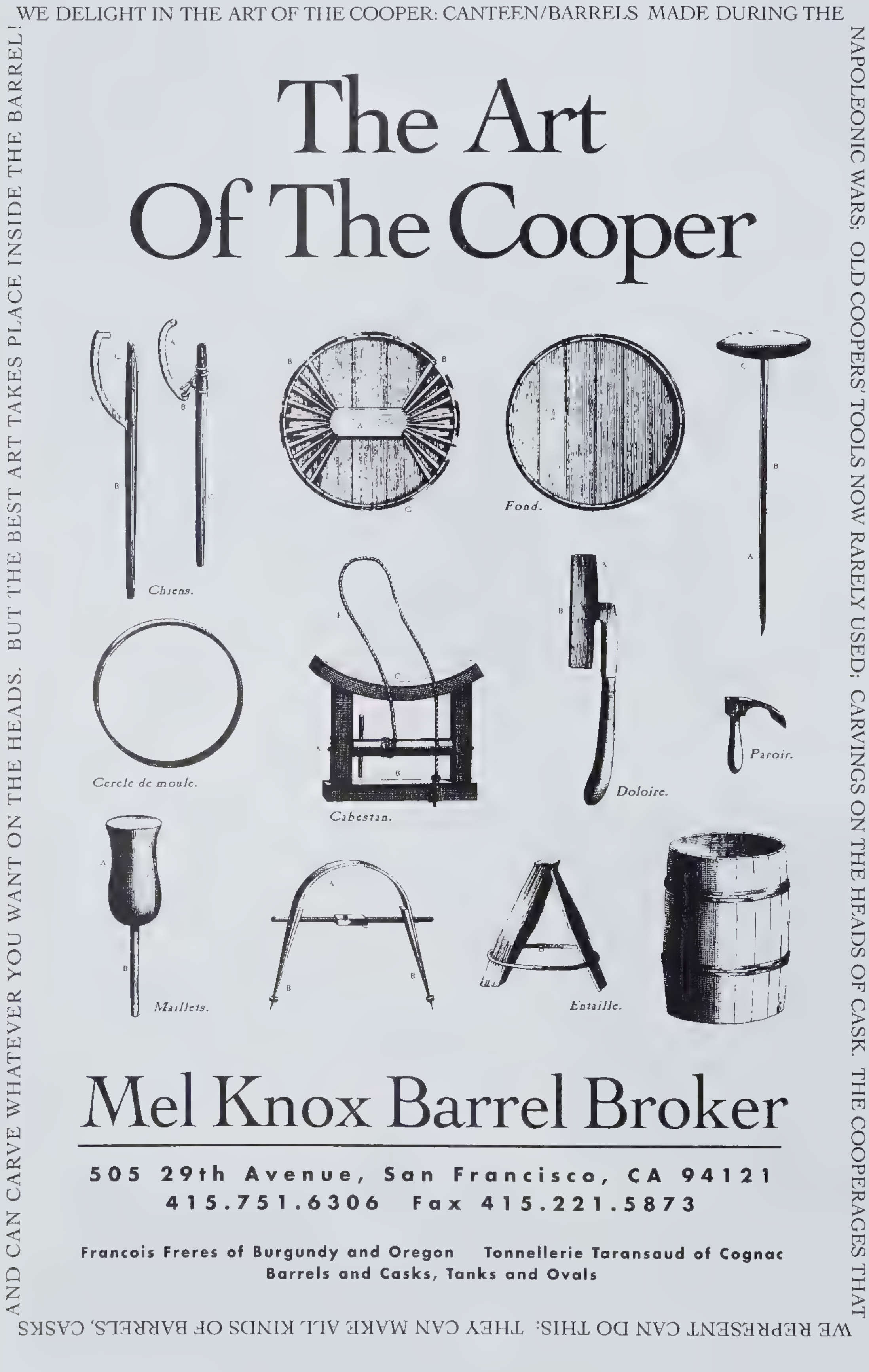

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Table III. Farming standard from the Soil Management chapter illustrates a standard with more than two levels and points awarded for each level.

3.4 Soil analysis for macronutrients	
a. I sent a soil sample from the vineyard to a lab for macro-nutrient analysis within last 12 months.	3
b. I sent a soil sample from the vineyard to a lab for macro-nutrient analysis within last three years	2
c. I sent a soil sample from the vineyard to a lab for macro-nutrient analysis within the last five years.	1
d. I have never taken soil samples from my vineyard and had them analyzed.	0

things, rather than just *not* do certain things. The Lodi Rules is much more than a "cause no harm" program. It's not enough to not pose risks to the environment, certain non-target organisms, or to farm workers, for example. In order to qualify, a grower must be using practices that actively enhance the safety and sustainability of their vineyards, farms, community, and surrounding ecosystem.

Pesticide environmental impact model

One unique aspect of *The Lodi Rules*/Protected Harvest certification model is the use of a pesticide environmental impact model to determine whether a vineyard qualifies for certification. Environmental impact models have been developed as tools to quantify the environmental impact of pesticides.

Table IV. Farming standard from the Pest Management chapter containing a "Fail Chapter" component. If a grower is at the bottom level, they score an "FC" and cannot certify that vineyard.

6.1 Vineyard monitoring for insect, mite, and disease pests	
a. My PCA and/or I monitor(s) the vineyard for insect, mite, and disease pests at least once every 10 days from bud break to harvest and keep a written record.	6
b. My PCA and/or I monitor(s) the vineyard for insect, mite, and disease pests at least once every 14 days during the growing season and keep a written record.	4
c. My PCA and/or I monitor(s) the vineyard for insect, mite, and disease pests at least once every 21 days and keep a written record.	2
d. My PCA and/or I monitor(s) the vineyard for insect, mite, and disease pests at least once a month and keep a written record.	0
e. I keep no vineyard monitoring records for insect, mite and disease pests.	FC

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Table V. PEAS model environmental impact units calculation for representative Lodi vineyard for 2004.

Input date	Chemical name	Rate/ Acre	Units	lbs AI* /acre	Impact index/lb AI	Impact units/acre
4/13/2004	Sulfur dust	15	lbs	14.70	0.157	2.31
4/22/2004	Sulfur dust	15	lbs	14.70	0.157	2.31
5/3/2004	Sulfur dust	15	lbs	14.70	0.157	2.31
5/13/2004	RoundUp Ultra Dry**	0.92	lbs	0.66	0.328	0.06
5/16/2004	Sulfur dust	14	lbs	13.72	0.157	2.15
5/29/2004	Sulfur dust	15	lbs	14.70	0.157	2.31
6/2/2004	Rally 40W	3.88	ozs	0.10	3.137	0.30
6/24/2004	Provado Solupak 75% WP	0.63	ozs	0.03	116.28	3.44
6/24/2004	Acramite 50 WS	0.87	lbs	0.44	1.64	0.71
6/24/2004	Pristine	11.49	oz	0.26	0.75	0.20
7/28/2004	Gramoxone Max**	1	pints	0.52	0.32	0.05
7/31/2004	RoundUp Ultra Dry**	0.63	lbs	0.45	0.328	0.04
			Total impact units for season:			**16.20**

* AI = Active Ingredient

** Herbicide was applied to one-third of vineyard acres so impact units were calculated accordingly.

Because of the process used by the U.S. Environmental Protection Agency to register pesticides, extensive data are available on toxicity and environmental impacts of pesticide-active ingredients commonly used in agriculture. However, the data is not readily available to most farmers and pest management specialists and rarely helps guide pesticide selection. To make these data more useful to growers, commodity groups, food companies, and IPM advisors experts have created pesticide environmental impact models. American Farmland Trust published a description and comparison of eight of these models.[10]

In order to determine which type of environmental impact model would be most appropriate for The Lodi Rules program, pesticide use data from Lodi vineyards were run through three of eight models reviewed by American Farmland Trust. (Analyses were done by Drs. Esther Day and Thomas Greiten, American Farmland Trust.)[10]

Models chosen were:

- Environmental Impact Quotient (EIQ), developed by Cornell University (New York),
- Environmental Yardstick for Pesticides (EYP), developed in Holland,
- SYNOPS (Synoptisches bewertungsmodell fur pflanzenschutzmittel), developed in Germany.

Pesticide use data were from the LWWC Biologically Integrated Farming System's (BIFS) database, containing eight years of farming data, including complete pesticide use for 70 vineyards farmed by 40 growers, totaling 2,500 acres. These vineyards represent many winegrape varieties, trellis systems, and soil types and are distributed throughout the Lodi region.

Each environmental impact model differs in methodology. EIQ uses a ranking methodology that ranks toxicological data and chemical property information on a scale of one to three or one to five, and then multiplies that score by the application rate to arrive at an environmental impact score.

EYP uses a groundwater-leaching program to calculate a predicted environmental concentration in groundwater. EYP also generates similar predicted environmental concentrations for surface-water and soil. These predicted environmental concentrations are then used in equations that include toxicological effects and the Dutch drinking water standard to arrive at environmental impact points.

SYNOPS generates predicted environmental concentrations in soil and water and then uses those predicted environmental concentrations in equations that also consider toxicological effects producing risk indices for soil and water.

A fourth environmental indicator model, the multi-attribute toxicity factor model (MATF), which was originally developed for the Healthy Grown certification program in Wisconsin, was also considered for use in The Lodi Rules program.

The MATF model ranks pesticide uses according to toxicity factor values for acute mammalian risk, chronic mammalian risk, ecological impacts, and impacts on beneficial organisms. These toxicity factor values are based on human health risk and eco-toxicological data. Once calculated, these toxicity factor values are multiplied by the application rate of the pesticide's active ingredient to determine final environmental impact units.

Models like MATF, whose output can be used to rank relative pesticide environmental impacts according to "toxicity units" or "Environmental Impact Units" (EIU) on a per acre treated basis, have several advantages.

For example, differences in the environmental impact units per treated acre for various pesticides registered for the same use, such as the many fungicides for powdery mildew control, can be used directly in guiding pesticide selection and to determine the level of skill and scope of precautions that should be taken by applicators. Or this basic metric can easily be used to estimate environmental impact units per acre, field or farm, or across a watershed, region, or country. Indices like MATF

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are usually based on both pesticide toxicity and application rates.

The Lodi Rules certification committee decided to develop an MATF-type model, so the environmental impact units on a per acre basis for a given vineyard could be calculated for all pesticides used during a year. The committee understood and accepted that applications of such a model would likely include the setting of standards and goals for pesticide risk reduction and determination for certification.

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Evolution of Pesticide Environmental Assessment System (PEAS)

Benbrook Consulting Services (BCS) has conducted a variety of analytical projects focusing on measurement of pesticide use and risks, IPM adoption, and the linkages and impacts of IPM on pesticide use and risks.

The initial work was carried out with Consumers Union from 1992 through 1996 and produced the first quantitative assessment of long-term acute and chronic pesticide risk trends in the U.S. based on nationwide pesticide use patterns. In addition, a methodology was developed for measuring progress along the IPM continuum, from low-levels of IPM to biointensive IPM. Design of these initial measurement tools and results of their early applications are reported in the Consumers Union book *Pest Management at the Crossroad*.[11]

Beginning in 1995, BCS participated in the collaboration project described above involving the World Wildlife Fund (WWF), Wisconsin Potato and Vegetable Growers Association (WPVGA), and University of Wisconsin (UW). The goals of this potato IPM collaboration included establishment of a pesticide risk measurement system and a method to measure progress along the IPM continuum.

The collaborators developed the MATF model (described above) and applied it to estimate a 1995 baseline of potato pesticide use and risks.[12] The Healthy Grown certification program and Protected Harvest evolved out of this collaboration. In the Healthy Grown program, the MATF model is used to calculate a total number of toxicity units for all pesticides applied per acre per year. To qualify for certification, a field cannot exceed an established threshold of toxicity units.

In 2001, the project team received a research IPM grant from the U.S. Department of Agriculture's "Risk Avoidance and Management Program" to support work in 2001-2003 on the continued development of the database and methods used to project pesticide risks. Since 2003, BCS has worked with Curtis Consulting and the Gerber Products Company to further develop its multi-attribute pesticide toxicity measurement system. BCS's role in this project has led to development of the Pesticide Environmental Assessment System (PEAS).

In developing PEAS, several major changes were made in the basis and focus of the MATF approach and the parameters used to estimate individual indices. The biggest difference between the Wisconsin project multi-attribute model and PEAS is that the Wisconsin model estimates ***potential*** pesticide toxicity, without regard to whether the target organisms reflected in the indices are actually exposed.

The basic metric is calculated by multiplying the pounds of a pesticide applied by its toxicity factor. While PEAS uses toxicity factor values similar to the Wisconsin model and also incorporates use rates in estimating per acre toxicity units, it also strives to take into account, to the extent possible, factors impacting likely levels of exposure based on where, when, and how a pesticide is applied. This process leads to a set of use-specific Use Pattern Adjustment Factors (UPAFs).

For example, an in-season, liquid foliar application is assumed to pose the highest potential exposure for workers and most non-target organisms, and it corresponds to a UPAF value of 1.0 (no downward adjustment in expected exposure levels). A change in use pattern to, for example, a pre-plant soil-incorporated granular application would result in a UPAF of 0.2, reflecting the lessened potential for exposure to workers. Accordingly, the Wisconsin MATF model projects ***potential*** risks, while PEAS is designed to rank ***relative*** risks, taking into account factors affecting exposure levels.

Scope of measurement system

Pesticides pose many different types of risks to a diverse array of non-target organisms including people, small aquatic organisms, fish, birds and bees, beneficial insects, soil microorganisms, worms, plants, and other wildlife.

The majority of data on pesticide hazards are based on measures of acute lethality to common test organisms after short-term exposures to a defined dose or concentration of a pesticide. To the full extent possible, the relative risk indices in MATF and PEAS are driven by toxicity data collected on the same organism at the same life stage, exposed in the same way, for the same time duration.

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Risks can arise from multiple routes of exposure (for people, via food, water, dermal, or inhalation exposure). Some exposures are short-term in nature (acute risks), and others occur steadily over a long period of time (chronic risks).

The Lodi Rules program adopted the PEAS model, which currently contains five component indices measuring:

- acute risks to workers,
- dietary risks to people from acute and chronic exposure,
- acute risks to small aquatic invertebrates,
- acute risks to birds,
- acute risks to bees and pest natural enemies.

Each of these indices is used independently to assess relative risks to a specific class of organisms on a per acre treated basis. For The Lodi Rules program, PEAS is used to calculate multi-attribute risks spanning all five indices. Because the certification committee felt that all five indices were equally important, the PEAS model weighs them equally.

Using The Lodi Rules PEAS model

The PEAS model was used to calculate pesticide impact units for each formulation of pesticide used in Lodi vineyards. Calculations were based on pesticide use in San Joaquin and Sacramento County vineyards. Data on rates were obtained from the California Department of Pesticide Regulation's "Pesticide Use Reporting" database for 1999 to 2001. This database is a full pesticide use reporting system. Pesticide use data were also obtained from LWWC's BIFS database, which has monitored full pesticide use in 70 vineyards throughout California Crush District #11 from 1995 to present.

Toxicity factor values were estimated for one pound of each pesticide active ingredient used in Lodi vineyards. These values were then adjusted in accord with the applicable UPAF, in order to make estimates of environmental impacts per acre of treatment reflect the impacts on exposure of the specific formulation, treatment timing, method of application (such as soil-applied, ground-applied, aerially-applied), and the target site (foliage, soil, etc.).

The result was an environmental impact index for each unit of pesticide formulation applied that could be used to estimate environmental impact units at any rate of application per acre. For example, the environmental impact index for one pound of sulfur dust active ingredient is 0.157, so the total number of environmental

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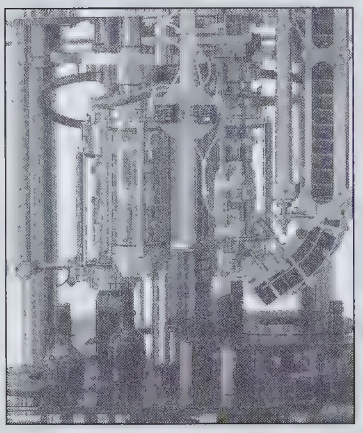

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impact units for an application of 15 lbs of formulated sulfur dust, which contains 14.7 lbs of active ingredient, is 2.31.

Table IV presents the calculation of total environmental impact units for pesticides applied to a "representative" vineyard in Lodi in 2004. It is readily apparent from this summary that sulfur dust is contributing the most to environmental impact.

Developing an accurate system to track and manage pesticide risks is a major task that requires a long-term commitment. It is the intent of the LWWC to refine PEAS annually as new and more accurate toxicology data are released and to encompass newly registered pesticides and new restrictions placed on existing products.

In addition, much work is needed to improve the accuracy and relevance of PEAS risk indicators to specific circumstances. For example, due to the importance of these issues in the Lodi region, the LWWC hopes to add a ground water index and a volatile organic compound (VOC) index to the PEAS model.

Certification

A Lodi vineyard qualifies for certification if it meets two criteria. First, the farming practices used in the vineyard

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must achieve a score of 50% or better for each chapter of The Lodi Rules. Scoring below 50% on any chapter, even if the scores are very high on all other chapters, disqualifies the vineyard from certification, and the vineyard must pass all 11 of the "Fail Chapter" standards.

Second, the environmental impact units for the pesticides used in that vineyard for the year, calculated by The Lodi Rules PEAS model, cannot exceed 50 units.

The vineyard must qualify for certification each year. An independent auditor will visit a vineyard to ensure compliance with The Lodi Rules and, using The Lodi Rules PEAS model, verify that pesticides used in the vineyard for the year have not exceeded the environmental impact unit threshold.

A grower joining The Lodi Rules program pays a sign-up fee that also covers the first year of certification. In subsequent years, an annual application fee is required, which is less than the sign-up fee. There is an annual dollar fee per acre of vineyard seeking certification. The annual certification fee per grower goes down as the number of growers in the program increases. The fees pay for administration and for auditing of the certification program by Protected Harvest.

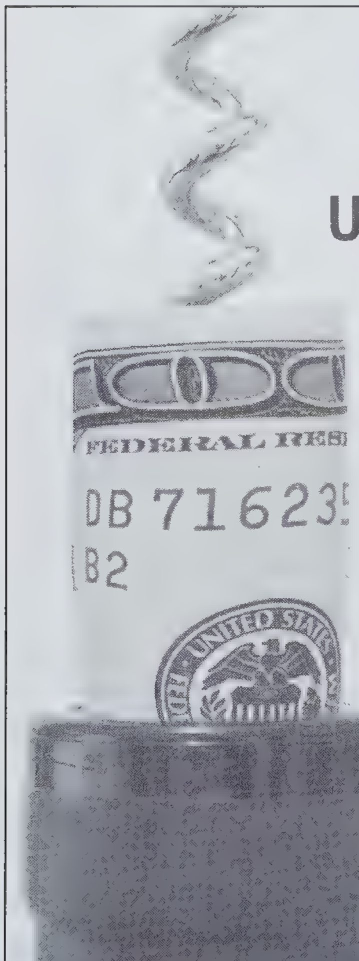
Potential benefits to Lodi growers

There are several ways that The Lodi Rules program could benefit Lodi winegrape growers. First, the certification committee felt very strongly that adhering to The Lodi Rules farming practices standards will produce higher quality wine. Second, the Lodi Rules/Protected Harvest seal should open up new markets to Lodi vintners and add value to the wine. Some of this added value will be passed back to the grower.

A third possibility is that a participating grower will be able to obtain a new contract with a winery interested in making wine with certified sustainable winegrapes. Participation in the program might also solidify an existing contract with a winery.

Finally, Lodi's commitment to the process of openly setting risk-reduction goals and seeking third-party certification sets the stage for constructive dialogue with the public, regulators, farmers, scientists, and the industry. Over the long run, this process will reinforce the district's commitment to food and farmer safety and environmental stewardship. It will also provide a framework to seek and achieve common goals through research, innovation, and education.

The Lodi Rules program will help the LWWC and Lodi wineries brand Lodi as a region where, according to The Lodi Rules mission statement: "Wines are grown with extra care by generations of farming families. We are



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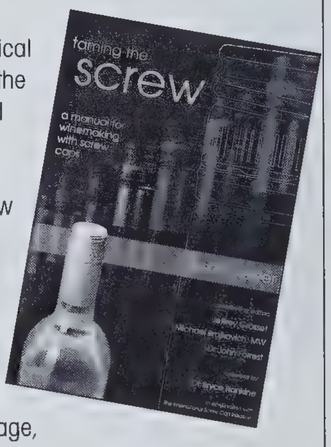

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Acknowledgements

Financial support for development of The Lodi Rules program has come through grants from U.S. Environmental Protection Agency Region IX, California State Water Resources Control Board, Great Valley Center, and the U.S. Department of Agriculture Value-Added Grant Program.

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Napa Valley

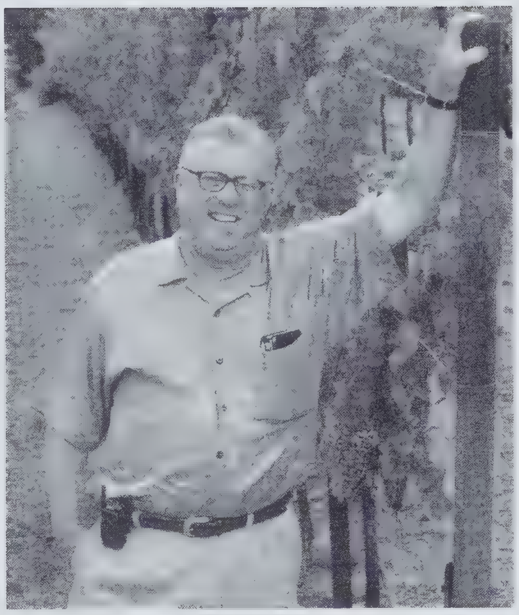
Integrity Award to Bob Steinhauer

BY Millie Howie

Long-time Beringer Vineyards manager, Bob Steinhauer, with four decades of commitment to quality winegrape growing was honored with the Lodi Woodbridge Winegrape Commission's (LWWC) annual Integrity Award October 13, 2005, in Lodi, CA at the LWWC's annual Integrity Award dinner celebrating the award recipient. More than 100 of his peers applauded his long list of achievements, which have contributed to industry advances since the 1960s. John Ledbetter (Vino Farms, Lodi, CA) spoke of Steinhauer's dedication of time and innovative expertise on critical industry issues, most recently as a leader on the Glassy Winged Sharpshooter Board in California.

Dana Merrill (president of Mesa Vineyard Management, Templeton, CA), hailed Steinhauer as one of the first to recognize that the Glassy Winged Sharpshooter and Pierce's disease (GWSS/PD) posed a significant threat to the future of the winegrape industry in California. "Steinhauer was an energizing force in efforts to muster industry-funding and state legislation supporting research into the control and eradication of GWSS/PD," said Merrill.

Steinhauer's hands-on career in vineyard management began in Delano in the Central Valley and shifted to the Napa Valley in 1971, where he has spent 26 years focusing on the demands of developing systems for enhancing the special qualities of Napa Valley vineyards. Now retired, Steinhauer is an avid student of change who pioneered the use of grow tubes, dual irrigation systems, and arbor trellising in Cabernet Sauvignon vineyards in Knights Valley.



Bob Steinhauer

"Our use of grow tubes," Steinhauer recalled, "began in 1990 when we were suffering extensive damage from turkey flocks eating the young shoots. I had seen the grow tubes used satisfactorily in Australia and started out with 5,000 of them the first year. The results extended beyond protection. I felt the vines actually improved when starting in the tubes. The next year we increased our use to half a million, and these tubes have been serviceable through several generations."

The use of the dual irrigation system, which Steinhauer says he did not innovate but uses extensively, began in the last couple of years in 600 acres of Beringer Vineyards in Sonoma County.

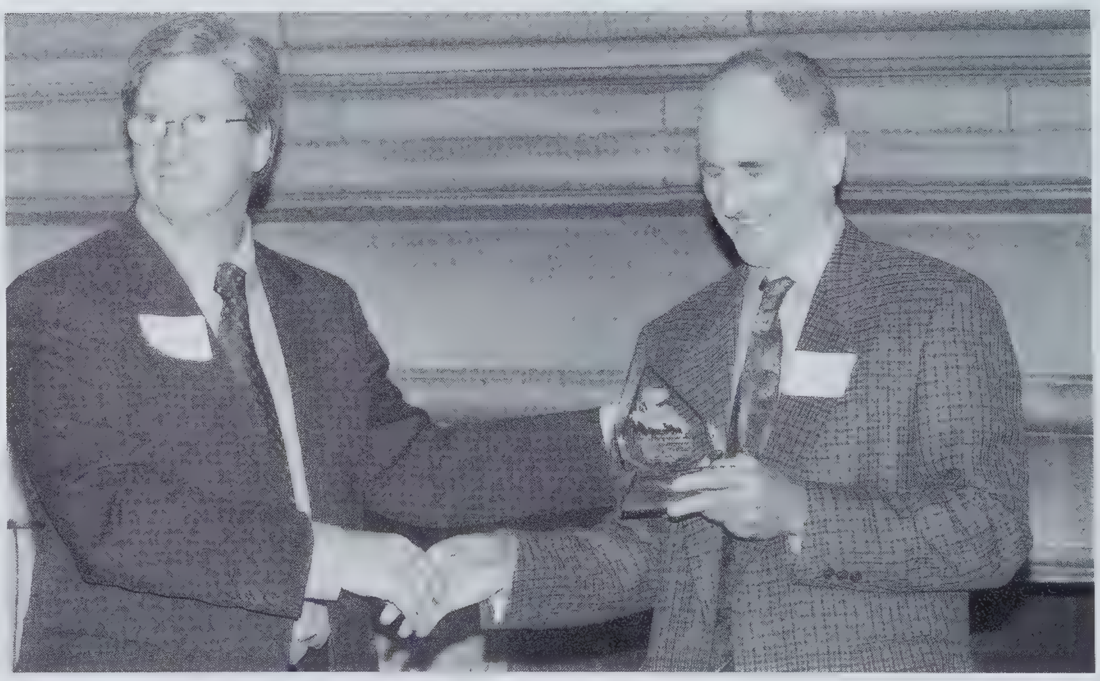
"Everything we do in those vineyards is dictated by soil type," says Steinhauer. "There are not a lot of straight avenues, as everything changes to draw the best from each soil type. We have really tried to put each vineyard block on appropriate rootstock with irrigation designed for specific soils. The blocks are picked independently, and everything is aimed at employing the best way to achieve quality."

Steinhauer's studies of the gable system of trellising in use in Italy and Argentina led him to employ the system on 10 acres of Cabernet Sauvignon, which has recently been expanded to additional acreage. "We're pretty happy with it, and, so far as I know, we are the only ones, outside of raisin grape growers in San Joaquin Valley, using the system."

Steinhauer gave much of the credit for his success to a naturally inquisitive nature and the friendship and teaching of mentors like Andre Tchelistcheff.

Barry Gnekow receives Award of Merit

"What leads us to honor Barry Gnekow tonight is his extensive work with Lodi wineries, guiding long-time



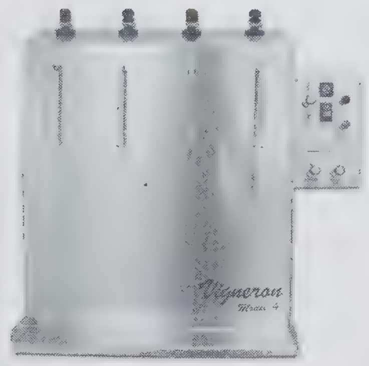
Barry Gnekow (R) accepts Lodi Merit Award from Mark Chandler (L). (Photo by Dale Goff) growers, who are neophyte winemakers, to success in this demanding business," explained Mark Chandler, executive director of the LWWC, in presenting the 2005 Lodi-Woodbridge Award of Merit to consultant Barry Gnekow at the Integrity Award event. The award is given in recognition of those who have made significant contributions to the local wine community.

"I remember chatting with Barry in 1996 when he said to me, 'There is no doubt this area can grow world class wines; specifically Cabernet Sauvignon, Petite Sirah, and Zinfandel.' Over the ensuing years Barry has helped to prove the accuracy of his statement."

Among the clients who benefit from Gnekow's winemaking consultancy are well-known wineries in some of California's most prestigious grape-growing regions, including many in the Lodi-Woodbridge area.

"For many," Chandler said, "it would be hard to imagine that Lodi wines could achieve accolades as they have among thousands of competing wines from every region of California. Barry shares the credit with outstanding winemakers at each of his client wineries.

"Uniquely, Barry is kind of a 'one-stop shopping' wine consultant. In addition to being an expert winemaker, Barry helps vintners with marketing and distribution connections, financial planning, and personnel placement. In short, Barry is not just a winemaker — he is a change-maker. If a measure of success is making a place better than it was when you found it, Barry has made his mark on Lodi." ■



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COVER STORY

Transforming your wine business from good to great

BY Deborah Steinthal, Scion Advisors

Wine business leaders today are being challenged to manage for profit and growth within an ever-more complex marketplace.

In response to this challenge some winery owners are hiring professional leadership for the first time, hiring a second-generation executive team to spearhead a new phase of growth. Utilizing Bouchaine Vineyards (Napa, CA) as a case study, this article describes effective leadership practices successfully implemented to achieve major change.

Many an owner struggles with the trade-off between hiring new, highly qualified professional staff and showing loyalty to past employees by investing in their development needs. The cold reality is that some of these employees may take years to develop. Based on our experience working with wineries (and businesses in other industries), we are able to conclude that a winery may seize critical windows of opportunity and spend much less in soft and hard development dollars if they hire higher-priced, qualified leadership .

Bouchaine Vineyards hired such leadership to transform their business and achieve sustainable profitability. Unlike the case study documenting the Joseph Phelps Vineyards growth plan (see "Growing profits by getting smaller," in *PWV* — November / December, 2004), the Bouchaine team still has a way to go to validate its decisions. This article documents what has been accomplished so far.

Why change?

Wine industry challenges are multifaceted and complex. They are regional, national, and global in scope. They include legal, political, and cultural developments and are also driven by forces of competition and consolidation that are forcing industry players to develop essential, focused, disciplined strategies to survive and prosper.

Large wineries are getting larger and are mostly publicly-held companies, a status that provides better access to capital sources for funding growth. These billion-dollar, mass merchandisers are forcing mid-size ($60 million to $500 million) and small (under $60 million) producers to become more specialized and better differentiated.

Small wineries must specialize

In this new emerging wine world, small wineries like Bouchaine are seeking to become more profitable and build long-term brand equity. The wineries that survive and prosper must specialize through stronger leadership, improved communications, better differentiated brands, more focused product portfolios, and a commitment to working even more closely with a larger number of important trade accounts and consumers seeking direct relationships with meaningful wine brands.

Compounding the problem is that sales and marketing costs are escalating from what used to be 15% or 20% to now 30% of sales, eating into profits. Depletion of annual inventories requires considerable *pushing* through the wholesale system. In addition, wine writers appear to be rewarding new industry entrants with high wine scores before they have even earned their laurels. Old familiar brands are consequently going stale at a faster rate than in the 1990s.

This environment is particularly detrimental to small wineries that have few resources to hire the necessary talent to keep their brands fresh and profitable. However, survival for many of these family businesses is dependent on their ability to tap into professional advisors and outside directors on their boards that are capable of helping them objectively develop more focused market strategies and effective execution practices.

Recognizing the need to change

Many winery owners find it very difficult to recognize that their business must change. They may, in fact, spend several years believing that things are fine because wine is selling through to wholesale.

If you are not tracking pricing and inventory levels in the market, for example, you do not know the impact they are having on your brand and market relationships. Pretty soon you are adding band-aids to your business: operating at higher debt ratios than you are comfortable with; working at a faster pace for harder and longer hours; launching a second brand to soak up excess grape commitments with the hope of generating more revenues; and cutting costs everywhere you can. At some point, you realize your existing structure and strategy are no longer viable. This was the situation at Bouchaine Vineyards in 2002.

Mike Richmond, vice president/winemaker surveys Bouchaine Vineyards in Carneros AVA. (Photos by Dona Kopol Bonick)

Bouchaine Vineyards Case Study

Gerret and Tatiana Copeland's ownership of Bouchaine Vineyards began in a partnership in 1981. They took sole ownership in 1993 and embarked on an upgrade of the facility, including the cellar and hospitality center. In 2000, 66 more acres were added to the vineyards for a total of 104 estate acres. Then in 2000, declining profitability of the winery led them to enlist PriceWaterhouse Coopers to conduct a study of the business.

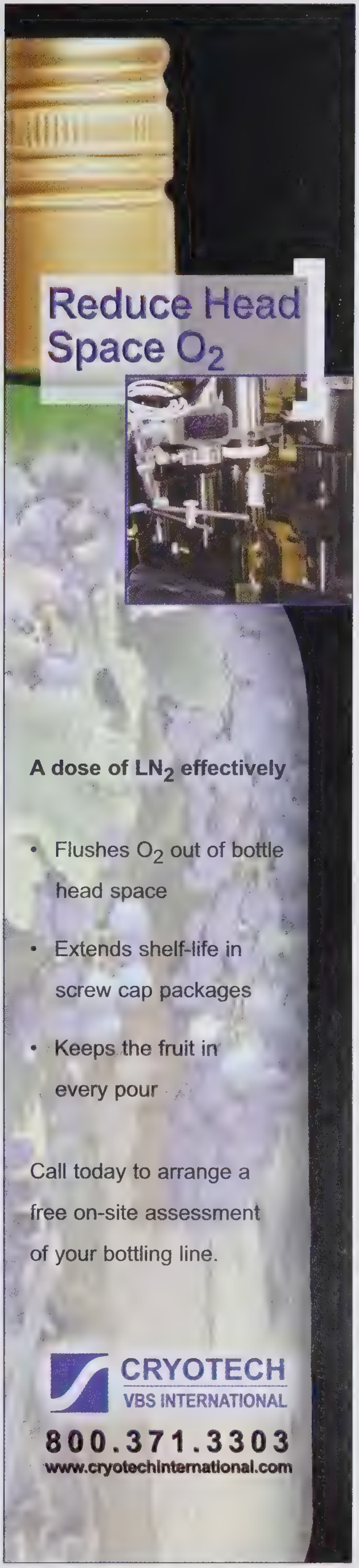
New on-site leadership was recommended, since absentee management (the Copelands reside in Wilmington, DE) simply could not respond with the immediacy required to lead daily operations and effectively implement their vision for the brand in a changing competitive market.

Fortunately, Michael Richmond, a founder of Acacia Vineyard with previous management experience at Freemark Abbey and Carmenet Vineyard, "showed up at our time of need," Tatiana recalls. The three share the same long-term vision for the winery, and they are committed to rebuilding the Bouchaine business.

Achieving change

When Richmond took over as vice president/winemaker in October 2002, the winery did not have an integrated plan or unified on-site leadership. Instead, he found contrasting management functions (winegrowing, administration, retail, sales, outside sales reps, and marketing), answering directly to the owners in Delaware.

Because Bouchaine wines were selling well in the rich sales climate of the late 1990s, the Copelands believed their winery systems and processes were sufficient, but the PriceWaterhouse Coopers study revealed that there was room for improvement. From Richmond's first interview with the owners, he and the Copelands



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Vice president and winemaker Michael Richmond.

began to generate a new plan for Bouchaine's future.

In three years, the new winery leadership has achieved promising results, with 50% annual growth in total sales beginning in 2002. First quarter depletions in 2005 increased 57% over 2004. First quarter Pinot Noir depletions alone increased 73% in 2005 over the first quarter of 2004.

Already, Bouchaine owners anticipate a return to profitability with a much more sustainable business model by 2006. "Since a winery's return to profitability is not without its surprises and challenges," Tatiana asserts, "be careful what you ask for. The results of our efforts have been radical change at the estate. True metamorphosis takes more time and resources than you ever plan for."

Strictly adhering to their own standards helps the Copelands stay

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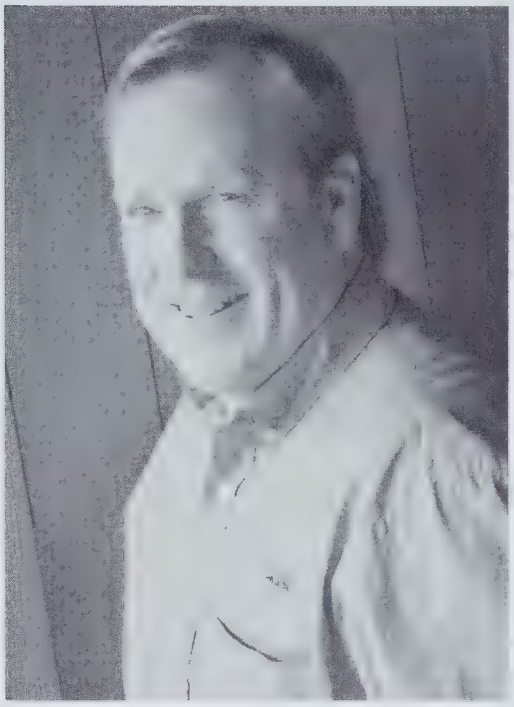
focused and manage the change they have achieved so far and additional changes they still see before them.

As Bouchaine is demonstrating, successful wineries are able to reinvent themselves to take advantage of market opportunity. Richmond and the Copelands agreed on some basic principles (Table I), that frequently are at the core of successful company transformations.

STEP ONE: Develop and articulate a compelling, market-based vision and business strategy aligned with ownership goals and responsibility.

At the beginning of their relationship in 2002, the Copelands and Richmond shared a vision based on five core components:

1. Integrate a sales and marketing strategy that fosters sustainable partnerships with all tiers of distribution —



Greg Gauthier is both wine production advisor, and VP of sales and marketing at Bouchaine Vineyards.

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2. Utilize higher-quality grapes that promote Chardonnay and Pinot Noir varietals more typical of the Carneros appellation. Secure the best grapes available in Carneros and commit to sustainable farming from the 100-acre vineyard estate.

3. Produce better wine that focuses on market opportunity. Implement the most up-to-date practices, while honoring the needs and tastes of the modern wine consumer.

4. Build a team capable of executing against the plan. Create a company culture where each employee feels empowered to succeed.

5. Build the brand image with packaging that embodies the winery location and communicates Bouchaine's definition of excellence. Build an inclusive rather than exclusive public persona backed by a high-quality image.

The three business leaders recognized that profitability would come from building important business infrastructure. They also realized that achieving this vision would require a considerable commitment of time and resources and that attaining profitability would take three to five years. Most important, the owners had the courage and passion to initiate a radical transformation of their winery model.

STEP TWO: Recruit a strong team that is dedicated to the vision and culture.

Richmond and the Copelands agree on an essential operating principle. Richmond summarizes, "The first step in transforming a business from good to great is to hire the best leadership team you can possibly afford and to hold them accountable."

Greg Gauthier was Richmond's first hire as vice president of sales and marketing and a partner in the turn-around effort. Gauthier has considerable expertise in launching and relaunching brands. As the Chalone Group's California state sales manager, Gauthier ran all brands — one-third of the company's business. He was previously Northern California vice president of sales for Henry Wine Group and was responsible for product launches at Sebastiani Vineyards & Winery (Sonoma, CA)and Sutter Home (St. Helena, CA). He was instrumental in redesigning the sales and marketing effort at Rodney Strong Vineyards (Healdsburg, CA), beginning with Tom Klein's ownership in the mid-1980s.

Hiring and developing the new Bouchaine team took longer than expected. Richmond and Gauthier needed six months to assess the exist-

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ing winery team, decide who should stay on the "Bouchaine Bus," and then hire talent capable of supporting execution of the new vision. However, an additional 18 months were required to develop a team that could work together and demonstrate new business discipline and to refine the company culture.

"Developing culture is a journey, not a destination. You are articulating, focusing, living, and fulfilling your vision," states Richmond. "We had to get the winery to think overnight as a sales company."

Richmond and Gauthier confronted several important cultural aspects of business transformation. They had to face reorganization fear and passive resistance to change. Ultimately, they had to make the really tough decision to let about 50% of the winery staff — those who could not evolve with the vision — "off the bus."

"At the core of our transition are marketing relationships developed by Mike and Greg," asserts Gerret. "They cleaned up the market and brought the new Bouchaine story to our distributor partners. They have hired a new generation of people to support our plan, including Lee Hodo, a marketing specialist known for bringing trade and community-backing to tired brands. They have communicated to our consumers a sense of place and our values, which include innovation, creativity, humor, and a long-term perspective."

Step Three: Expect and plan for profitability to take a hit while business fundamentals are re-established: execution, leadership, and organization practices.

Success for the Copelands, Richmond, and Gauthier depends on building profits, not on building volume. In order to accomplish this, a proper business foundation needs to exist that delivers sustained profitability, while building brand value.

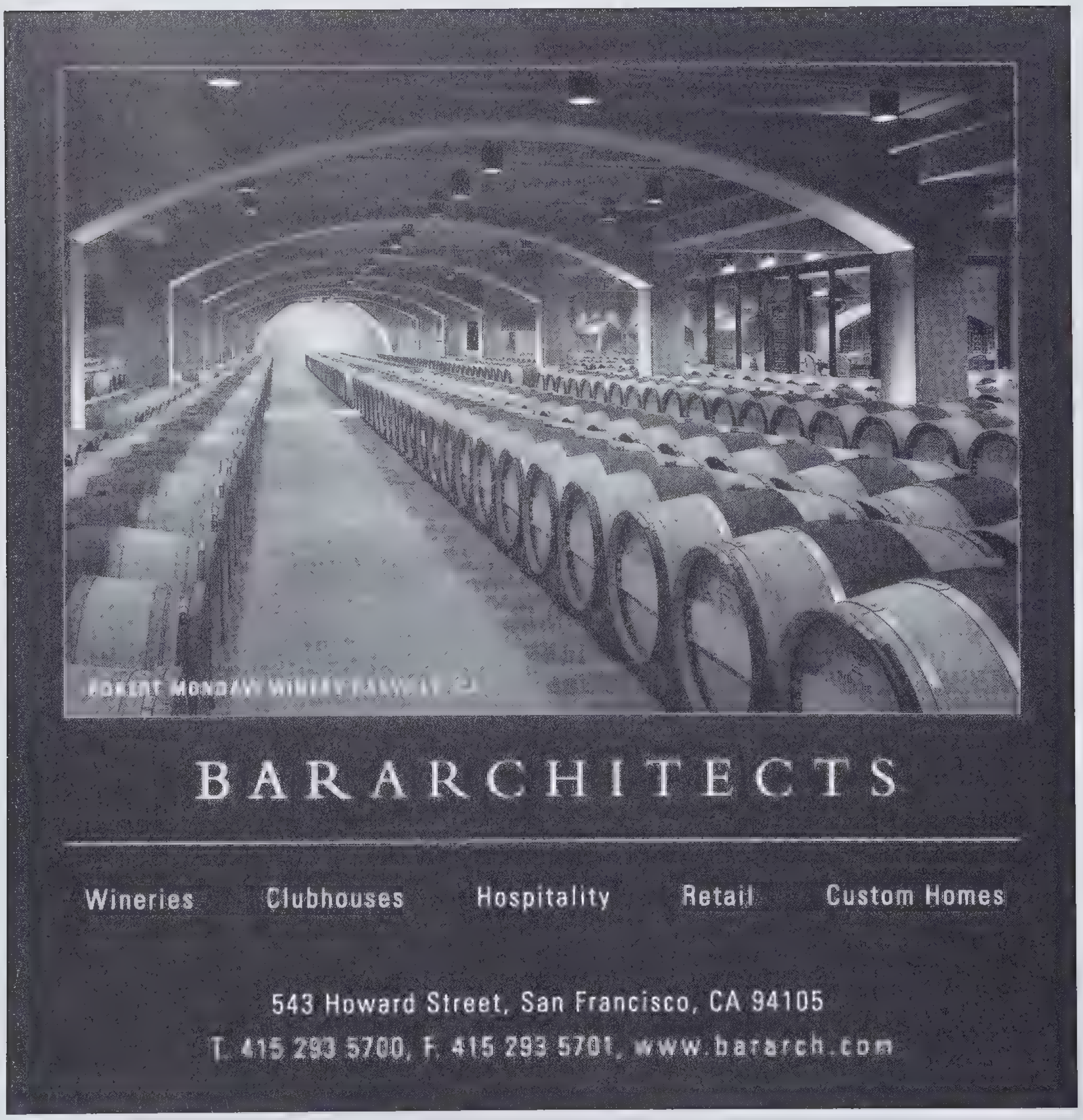
Richmond and the Copelands concur with another fundamental operating principle for successful transformation of their business: short-term profitability would take a hit while they rebuilt their brand and price in the marketplace. This meant establishing a strong sales and marketing infrastructure, changing wine style, and refining the brand through packaging and pricing.

Establish a sales model

"Historical emphasis was on *marketing*, not *sales*," explains Gauthier. "The staff tried to solve inventory build-up through marketing — not sales programming. The only leverage that the two regional sales people had formerly was pricing — lowering the price to $35 and $65 per case, which destroyed profits and brand equity. The existing Bouchaine label was being compromised and associated with declining performance.

"Marketing is useless without strong distributor infrastructure," says Gauthier. Richmond adds, "Building on our personal credibility with a handful of key wholesalers, with whom we had relationships in the past, Gauthier and I convinced them to stay with the brand, allowing us to keep cash flowing."

To achieve this, the Bouchaine sales team, comprised of Richmond and Gauthier and two regional sales representatives hit the streets and began rebuilding the winery's credibility and instilling a process for holding both Bouchaine and their distributors accountable for brand performance.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Each state presented its own set of sales problems. In several states, the winery was stuck with negative, irresolvable distributor scenarios, so they changed wholesalers. Many key distributors were retained and, with help from Richmond and Gauthier, pricing and inventory issues were resolved. Together, they eliminated un-saleable wine and discounted other wines.

"You don't want to waste a distributor's time and effort by dwelling on the past; you want to move them to the future," notes Gauthier. "We communicated and delivered our plan to restructure pricing, packaging, and profitability — and our promise that winery support was going to be there."

Rebuilding price

The real question Bouchaine faced was how to go about rebuilding price? The core of their pricing strategy was to introduce new wines at a different price point and to grow estate brand pricing by 50%. From the beginning, they promised better wines, better quality, and better consistency. Through every step, the new leadership team made sure they had the Copeland's commitment to sometimes far-reaching change.

Bouchaine also had to contend with the singular challenge facing all small wineries in today's convoluted marketplace: how to get their wines through the distributor bottleneck. To achieve this, Bouchaine's wines were carefully allocated by distributor; they created a fourth tier of gatekeepers by hiring the right brokers to put more feet on the street; and they started tracking and managing 100% of depletions in all markets. "If you are not monitoring your depletions, then you are not monitoring the success of your distributors," says Gauthier.

Gauthier also describes early good news, "We realized the wines didn't have a bad reputation, we seemed to have NO reputation. The winery was making wines as good as it had ever been making, but the market had changed. The market evolved stylistically, and the wine style had not evolved."

The entire sales team delivered the message that, "We would produce the finest tandem team of Carneros Chardonnay and Pinot Noir available." They would also be there to support and monitor marketing and sales as needed in their marketplace. They had now moved the distributor scenario from a sell-in to sale-through (depletion).

Adding a second label

To support their commitment to their core brand, Richmond sourced better fruit and established more stringent selection criteria for the wines slated for the Bouchaine label, thus necessitating a second label.

The second label gives the winery an outlet for moving very good Pinot Noir and Chardonnay wine that does not meet the new standard for Bouchaine-labeled wines. "This wine still represented such strong value that it became the hook we needed to persuade people to take a new look at Bouchaine," adds Gauthier.

For the second label packaging, Richmond and Gauthier created new and stronger packaging which referenced the historic railroad station adjacent to the Bouchaine property. The second label was launched under the name Buchli Station to provide a good value in the $13 to $15 price range.

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New Bouchaine label

Richmond is delivering a new style suiting today's market. Vineyard blocks are being replanted for wine quality, with a systematic plan to replant the entire estate. The production regime has been adjusted, new equipment acquired, and grape maturity reexamined with an eye toward a richer wine style.

Beginning in sales year 2004, the Bouchaine label was redesigned and repositioned to represent a new more sophisticated style. In that year, the winery sold 5,000 cases of 2002 Bouchaine Pinot Noir and 4,000 cases of 2003 Chardonnay.

"Within 12 months, new accounts began giving us 'thumbs up,' and we achieved sales growth of 50% in 2003 over 2002," states Gauthier. By reprioritizing sales management regionally, the winery had the infrastructure in place to enable the team to deliver stronger outreach and increased communications such as updates on winery activities, winegrowing, and winemaking.

Visiting the winery

When visiting Bouchaine, one is struck by its culture of rustic, down-home friendly hospitality. They have succeeded in designing a memorable place to visit; it offers a strong sense of locality for people who visit and return home telling stories. This is a hard thing to achieve as one winery among 1,142 in California, these days.

When I arrived to interview the leadership team, an unannounced group of European physicians descended on the winery. Gauthier invited them (and me) on a special tour of the estate; packing us into the back of a pick up truck.

We embarked on a bumpy, but exciting and educational, drive through the vineyards — noting owl boxes, erosion control methods, replanting projects, and panoramic, breath-taking views. Gauthier was clearly proud that Bouchaine has received the first Green Farm Certification in Napa, underlining the winery's commitment to sustainable winegrowing and business practices. Even the winery structure itself is built from reclaimed, old redwood tanks.

These are brand messages that are evident to consumers seeking direct relationships with Bouchaine. Richmond has succeeded in getting the hospitality team's commitment and support to deliver both profits and long-term, loyal brand ambassadors through this channel.

During my visit, I discovered that Bouchaine's marketing team is preparing to launch the Bacchus Collection to a growing wine club

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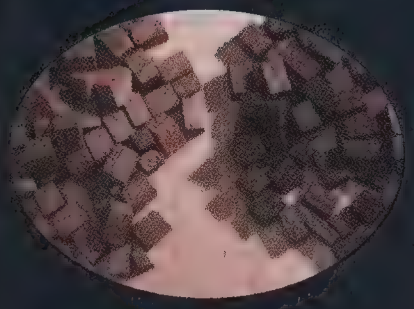

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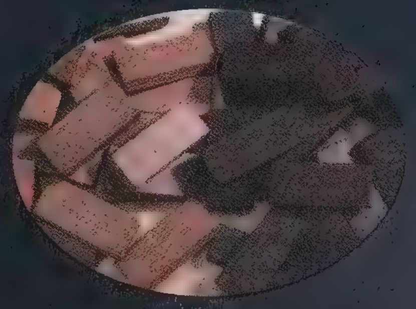

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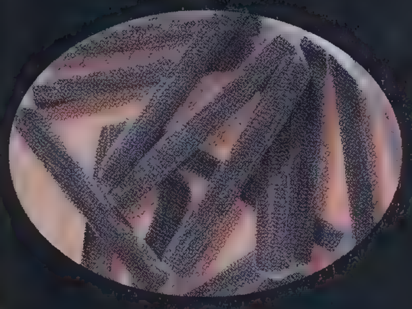

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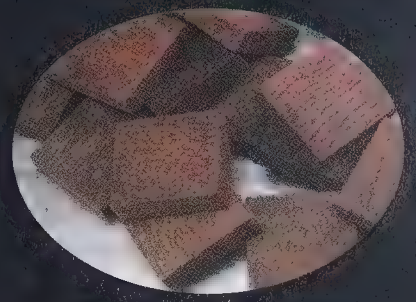

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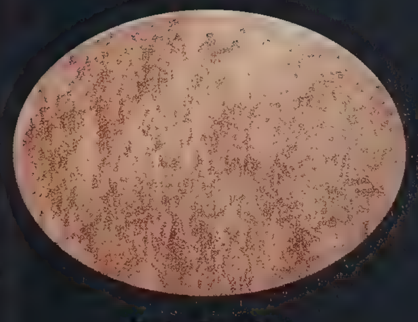

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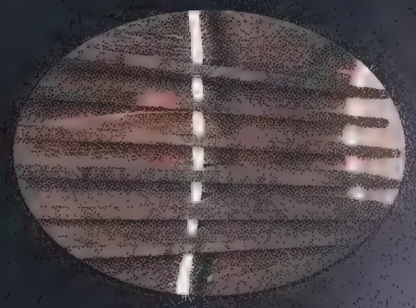

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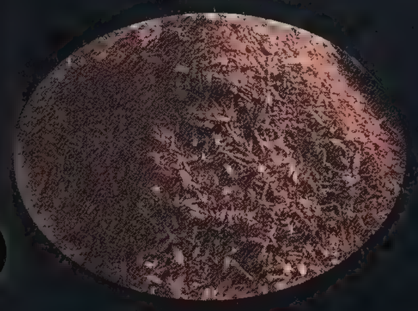

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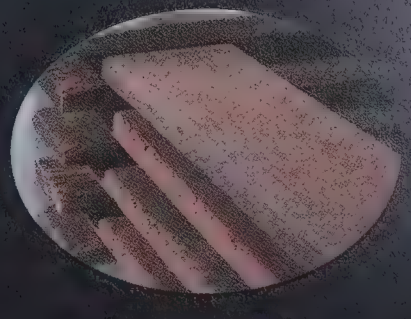

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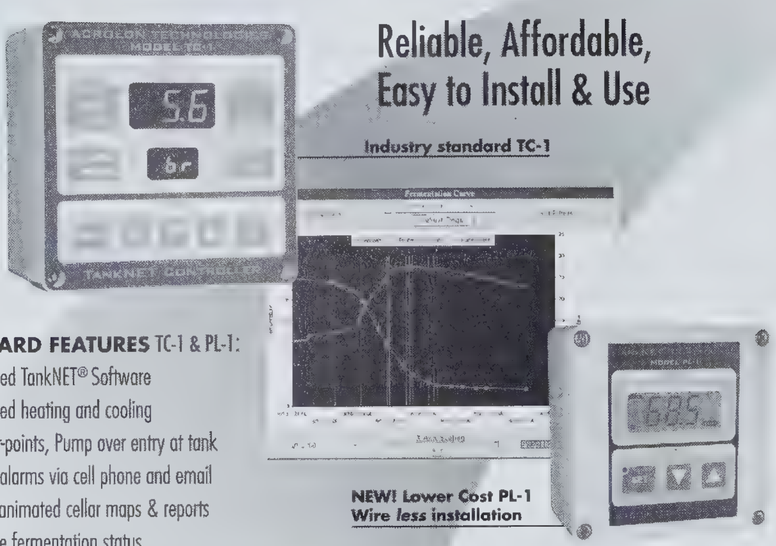

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Woody Allen says: "90% of life is showing up," and with four strong brand ambassadors constantly in the market and consistent, day-after-day winery communications, momentum has started to build around the brand nationally.

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Richmond likens the success of Bouchaine to the same commitment required to make good wine. "We have to have faith and trust in the integrated system that we are working so hard to build for Bouchaine." He knows it takes three years to introduce a brand, to have it accepted, and to break-even. It takes five years to be profitable and sustainable.

What Bouchaine Vineyards and other, small producers are realizing is they need to become more specialized to survive and prosper. To do this, they need to do more than "Just show up." ■

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GRAPE, OBSCURE, OR VINE

Which mealybug is it, why should you care?

BY Lucia G. Varela, Rhonda J. Smith, Mark Battany, and Walt Bentley University of California Cooperative Extension

Three mealybugs species now occur in wine grape regions of California: grape mealybug (*Pseudococcus maritimus*), obscure mealybug (*P. viburni*) and vine mealybug (*Planococcus ficus*). It is important to distinguish among them because their life cycles are different, and thus chemical control measures (if necessary), must be tailored to the specific pest.

The recently introduced vine mealybug is spreading throughout the grape growing regions in California. It can reach damaging levels very quickly by contaminating grape clusters with mealybugs, honeydew, and sooty mold. North and Central Coast growers have been battling vine mealybug for three to six years respectively and it has been a problem in San Joaquin Valley vineyards since the mid 1990s.

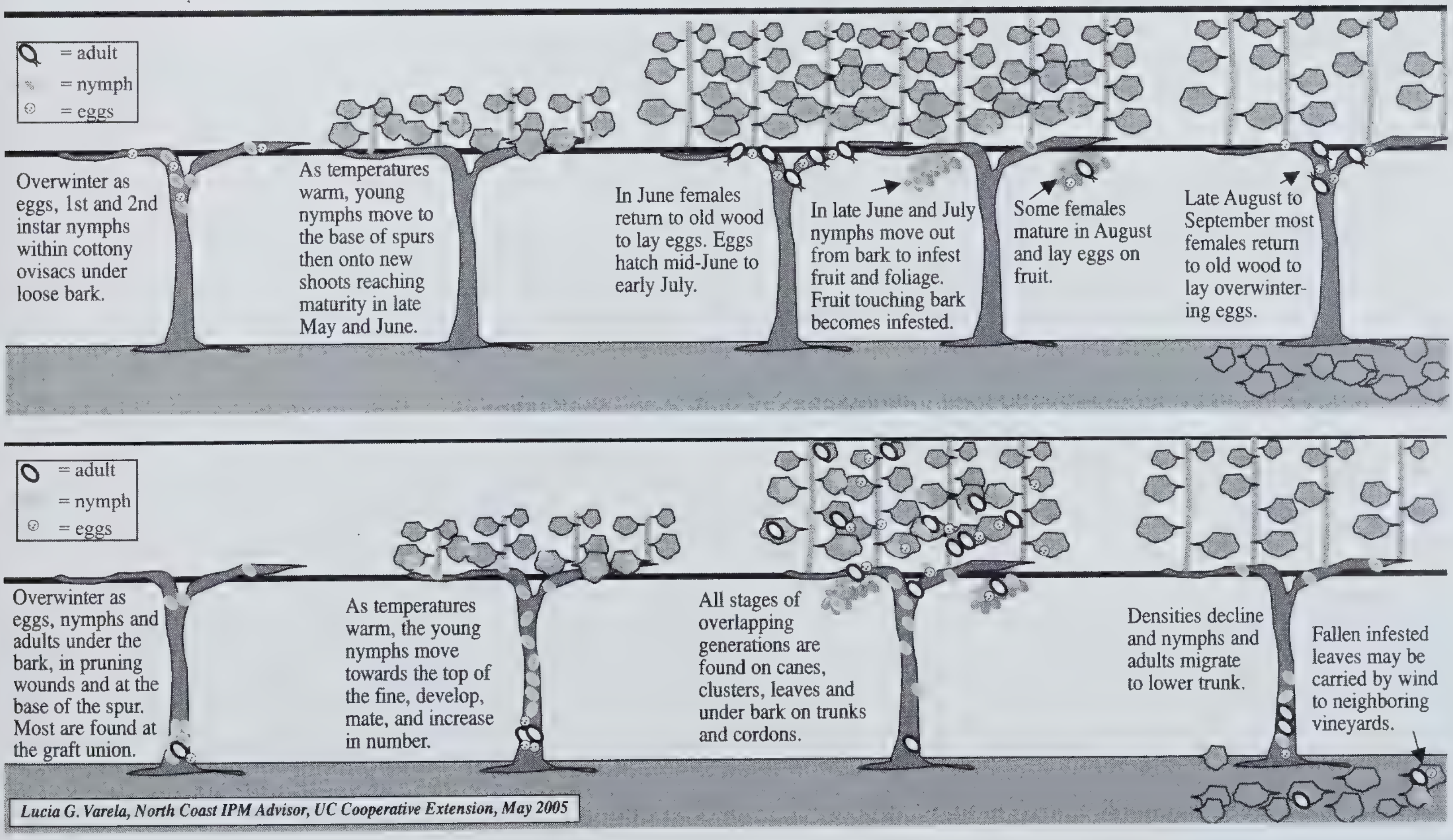
Movement of vine mealybug to new regions has necessitated aggressive chemical management and modified farming practices to curtail its spread and the damage it can cause. As a result, vine mealybug has grabbed headlines and become a focus of attention for growers and wineries.

A strong effort is underway to detect new vine mealybug infestations early in order to control the insect and prevent further spread, both within the block where it is first discovered and to adjacent vineyards.

This extra scrutiny has also increased concerns regarding two other mealybugs that are more commonly found in vineyards. While searching for signs of vine mealybugs, growers and Pest Control Advisers (PCAs) frequently find grape mealybug or obscure mealybug. They now have to recognize the similarities and differences in three species of mealybugs to correctly identify, monitor and control them.

Origins and need for chemical control

Grape mealybug is native to North America and exists in many parts of California. It has probably gone unnoticed in many vineyards and has not caused economic damage due to low


= adult
= nymph
= eggs
Overwinter as eggs, 1st and 2nd instar nymphs within cottony ovisacs under loose bark.
As temperatures warm, young nymphs move to the base of spurs then onto new shoots reaching maturity in late May and June.
In June females return to old wood to lay eggs. Eggs hatch mid-June to early July.
In late June and July nymphs move out from bark to infest fruit and foliage. Fruit touching bark becomes infested.
Some females mature in August and lay eggs on fruit.
Late August to September most females return to old wood to lay overwintering eggs.
= adult
= nymph
= eggs
Overwinter as eggs, nymphs and adults under the bark, in pruning wounds and at the base of the spur. Most are found at the graft union.
As temperatures warm, the young nymphs move towards the top of the fine, develop, mate, and increase in number.
All stages of overlapping generations are found on canes, clusters, leaves and under bark on trunks and cordons.
Densities decline and nymphs and adults migrate to lower trunk.
Fallen infested leaves may be carried by wind to neighboring vineyards.

Lucia G. Varela, North Coast IPM Advisor, UC Cooperative Extension, May 2005 populations. Because it is native, a large complex of natural enemies exists and thus it is often under good biological control.

Obscure mealybug is an introduced species that has been present in California since the late 1800s. Because it is an exotic pest, it has few natural enemies. Obscure mealybug has a narrower tolerance to cold temperatures than the grape mealybug and is found primarily in coastal regions. Currently, the largest populations of obscure mealybug are found in the Central Coast.

Vine mealybug is an economic pest of vineyards in the Mediterranean regions of Europe, Africa, and the Middle East. It has also been introduced into South Africa, South America, and the southeastern U.S. Vine mealybug has a few natural enemies in California that were introduced in the 1940s for control of a related species, the citrus mealybug.

Occasionally, control of grape or obscure mealybug requires chemical application(s). Fruit can become infested with these mealybugs when populations are high, especially when clusters touch older wood on the vine such as the cordon. In contrast, vine mealybug infestations can reach much higher population levels than grape or obscure and cause more damage to clusters and the vine. At this time, chemical applications are required to control this pest.

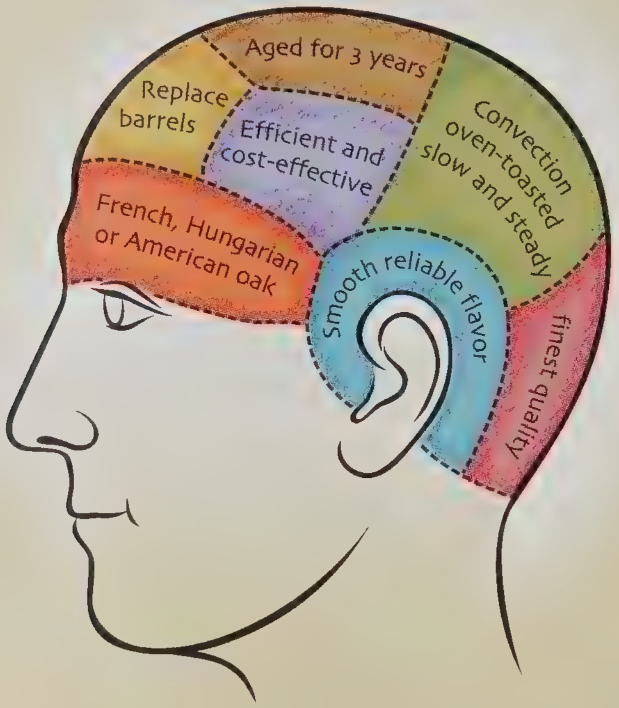
Honeydew and ant tending

Mealybugs feed on the phloem and excrete a sugary solution called honeydew. Ants are often found in association with mealybugs because they will feed on the sugary excrement. In fact, the ants will tend the mealybugs and keep away natural enemies in order to maximize the production of honeydew.

The degree of honeydew production varies by species and increases from small to significant amounts with grape, obscure, and vine mealybugs respectively.

Honeydew can be seen as shiny and sticky areas on leaves, clusters, and trunks. A wet trunk is an indication that a colony of mealybugs is feeding under the bark and honeydew is seeping through the bark. Argentine and gray ants are the most common ant species that tend mealybugs to obtain honeydew.

The amount of honeydew visible on a vine depends not only on the mealybug species but also on the number of ants tending the colonies. When ants are not present, honeydew produced by all mealybugs can result in wet trunks because the ants are not consuming it. Although it is more common to see wet trunks with vine mealybug infestations, a large population of grape mealybugs in the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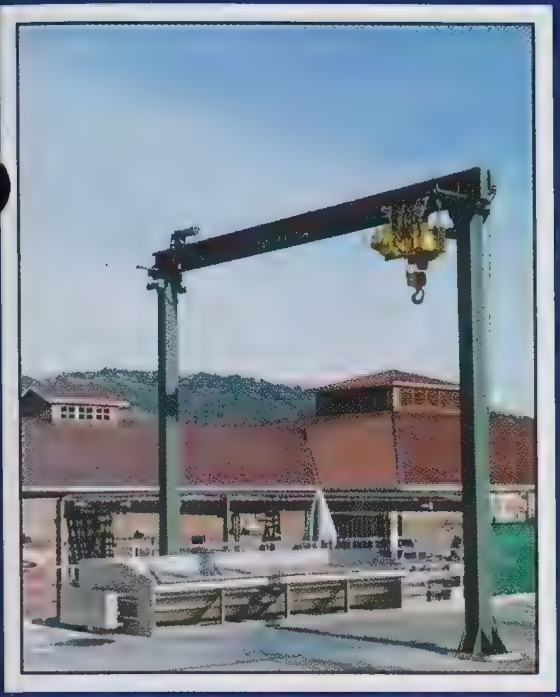

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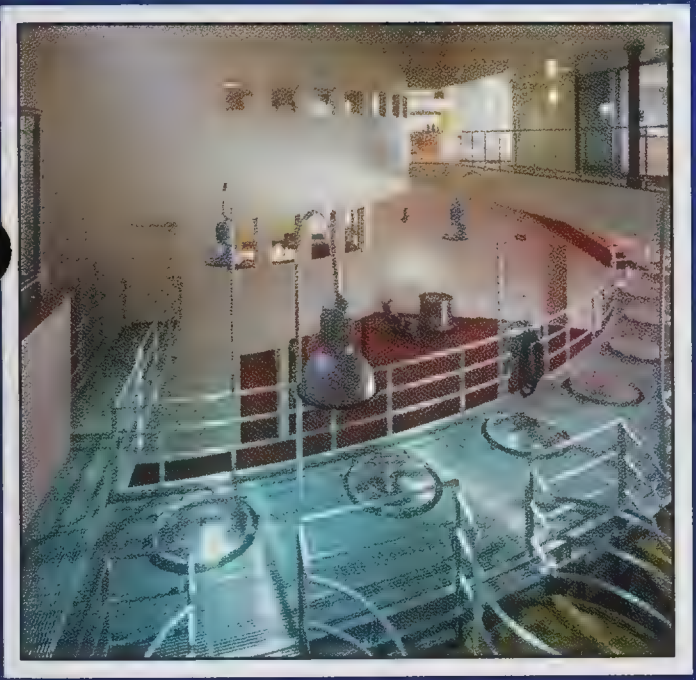

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Table I: Distinguishing characteristics of grape, obscure and vine mealybugs.

	Mealybugs		
	Grape *Pseudococcus maritimus*	Obscure *Pseudococcus viburni*	Vine *Planococcus ficus*
Body shape	Rectangular	Rectangular	Oval
Filaments surrounding body	Thin, non-uniform	Thin, non-uniform	Thick, uniform
Filaments posterior end	Thin, long	Thin, long	Thick, short
Defensive fluid	Reddish, orange	Clear	Clear
Diapause (dormant period)	Yes	No	No
Generations	2	2 to 3	4 to 7
Synchronized generations?	Yes	No	No
Stages overlap throughout year?	No	Yes	Yes
Overwinters under the bark **primarily** in:	Upper trunk, cordons, spurs	Trunk, cordons, spurs	Graft union, pruning wounds on trunk, base of spurs. (roots in light soils)
In summer lays eggs	Under bark on old wood, bunches	Under bark on old wood, bunches	Under bark on old wood, bunches, throughout the canopy above the fruit zone
Honeydew production	Moderate	Moderate to high	High

absence of ants will also result in wet trunks.

Morphological differences

The mealybug covers its body with a waxy secretion that creates a white, mealy appearance in all three species. Wax also accumulates on hairs that extend around the circumference of the body, forming white fringe-like filaments. The appearance of the white filaments distinguish the vine mealybug from those in the genus *Pseudococcus* (grape and obscure mealybug).

GRAPE AND OBSCURE MEALYBUGS: The body shape of the immature and female grape and obscure mealybug is rectangular with rounded anterior and posterior ends (Figure I, right). The hairs surrounding the body are longer than those of the vine mealybug. Since the hairs are longer, the wax accumulates more thinly along the length (the filaments may appear crooked, bent or otherwise irregular).

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Growers work together in vine mealybug workgroup

**BY Nick Frey, Executive Director
Sonoma County Grape Growers Association**

When vine mealybug (VMB) was first discovered in the Carneros region, the growers and wineries organized a workgroup led by Katey Taylor (viticulturist for Domaine Chandon). The workgroup provided trap placement and reading services for growers. The program expanded in 2005 to include growers outside of Carneros. Clearly, these growers recognize the value of working together to combat this exotic pest.

Carneros growers were able to manage VMB infestations in 2005 and harvest fruit that met quality expectations. This was achieved with the use of insecticides. Several new infestations were found by vineyard workers when leafing or cluster thinning. In addition to field workers, the group suggested that fruit samplers also be trained to identify VMB. When they remove berries or clusters, mealybugs inside the clusters are revealed.

It is also clear that VMB is spreading naturally now. No longer are infestations only associated with new vine plantings. If you have a vineyard near an infested vineyard, you are at higher risk of becoming infested with VMB. However, new infestations are not necessarily along the edge of the infested site.

Both Katey Taylor and Lucia Varela (University of California Cooperative Extension [UCCE]), emphasize the importance of growers working together to slow the spread of VMB. If you are interested in joining the VMB Workgroup in 2006, contact Katey Taylor (katey_taylor@chandon.com). Participation is not limited to growers in the Carneros area.

The 2005 VMB workgroup program had 339 trap sites. Of those, 90 sites had VMB males. They do not, as yet, know the number of female infestations associated with the 90 sites that trapped males. As learned previously, trappings in September/October detected the largest number of VMB males, nevertheless early trapping is still worthwhile because early detection is critical to reduce fruit damage and loss and to have any chance of eradicating an early stage infestation.

Trapping should continue after an infestation is found to track the effectiveness of insecticide treatments in reducing VMB numbers. The consensus of the group is that everyone needs to trap for VMB and everyone needs to talk to their neighbors to learn if or where VMB exists relative to their property.

The 2005 VMB workgroup results suggest that trap densities of greater than one per 30 acres may be needed. In windy locations such as Carneros, traps may be close to infested plants and yet not catch any males. To be successful, traps need to be placed downwind of the infestation which may be a challenge in a windy region such as Carneros. It is also suggested that more traps be added to the trapping grid during September and October when male numbers are highest.

If growers fail to identify or treat a VMB infestation, fruit quality will be affected and ultimately vine health will decline. Experience to date indicates VMB monitoring, pesticide treatment and sanitation can cost as much as $1,000/acre under certain circumstances if the grower's objective is eradication.

It is clear that new sustainable controls for VMB are needed. Potential new strategies include registration of a new systemic insecticide with greater efficacy than Admire, especially on heavy soils, new ant-bait stations to reduce ant populations (likely available in 2007), mating disruption and new biological control agents now being evaluated.

Among the biological control agents, it is hoped that parasites can be released that will attack different VMB life stages. Two species of parasites under evaluation by Kent Daane (UC Cooperative Extension Specialist) are very aggressive in laboratory tests.

There is a growing consensus that VMB is here to stay. Thus, we must make efforts to limit or slow its spread. Trapping and talking with neighbors are critical actions every grower should take. We also need to develop cost-effective IPM programs that rely less on heavy insecticide use. There are promising options, but more work is needed to create a successful IPM strategy.

The Sonoma County Grape Growers Association encourages the formation of additional VMB workgroups. Cooperation among growers is critical. Winery support is important, including training berry samplers to identify VMB. UCCE north coast staff will continue to provide training for vineyard employees and berry samplers in 2006. ■

The waxy filaments in grape and obscure mealybug are longer, thinner, slightly less parallel and thus have a more untidy appearance than those of the vine mealybug. More noticeable are the hairs at the posterior end of the abdomen that are considerably longer than the ones surrounding the rest of the body. The result is two to four long, caudal filaments that appear as tails.

If the insect is not disturbed, tails are easily seen in large immatures or in adult females and are the strongest characteristic with which to distinguish *Pseudococcus* mealybugs from vine mealybug. It is more difficult to see the long tails in younger stages, however *Pseudococcus* immatures can still be distinguished by the rectangular body shape and by the thin, irregularly formed filaments surrounding the body.

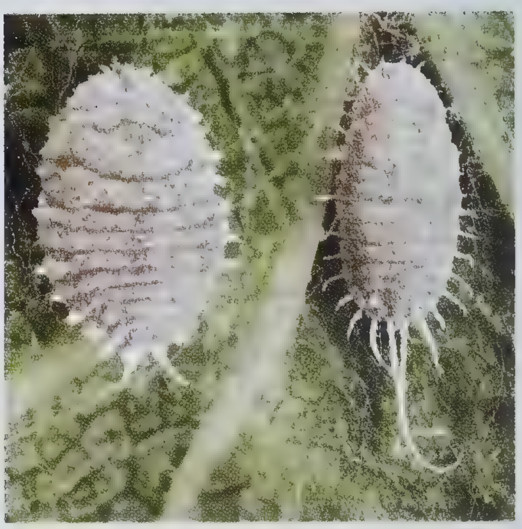

Figure I. Vine mealybug female (left) with oval body shape, thick, even (uniform) filaments and short tails and grape mealybug (right) with rectangular body shape, thin, slightly unparallel (non-uniform) filaments and long tails (photo: Jack Kelly Clark).

Grape and obscure mealybugs can also be distinguished from each other by the color of a defensive fluid they secrete when threatened. The fluid is exuded as a droplet from pores at the anterior and/or posterior end of the body. Gently poke the insect with a sharp object without puncturing the body until the fluid is excreted. If the

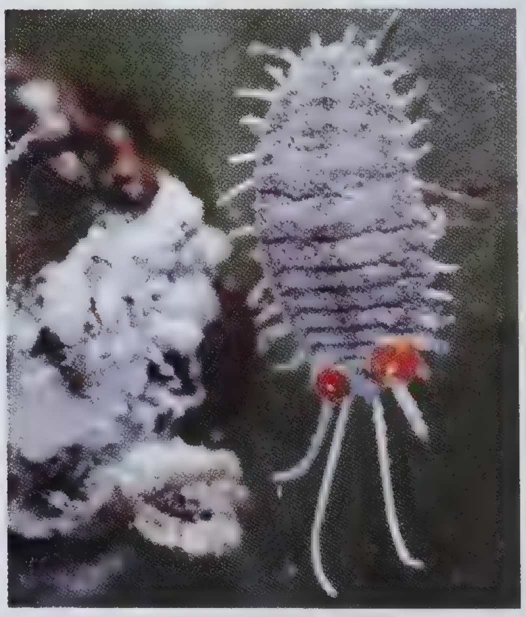

Figure II. Reddish orange fluid excreted by grape mealybug (photo: JKC).

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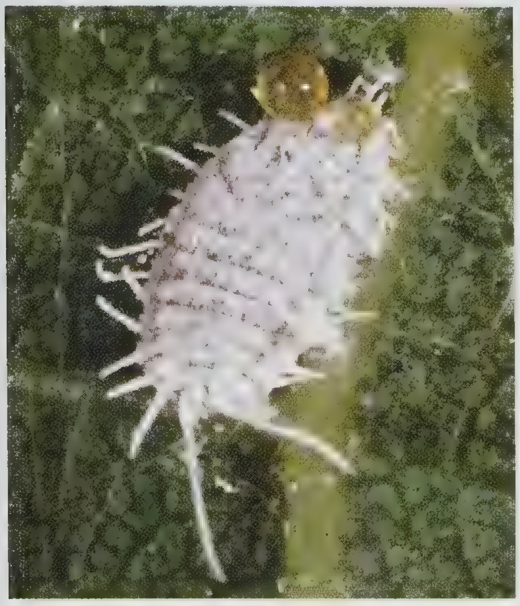


Figure III. Clear fluid excreted by obscure mealybug (photo: Kent M. Daane).

color of the fluid is reddish orange, the insect is grape mealybug (Figure II); if it is clear, then it is obscure mealybug (Figure III).

Vine mealybug: The body shape of the immature and adult female vine mealybug is oblong (Figure I, left); wider at the center of the body as compared to the anterior and posterior ends. The hairs surrounding the body are short in comparison to those of *Pseudococcus* mealybugs. Wax accumulation on the hairs result in short, uniform, and thick filaments. The posterior end of the adult female has **slightly** longer filaments than those that surround the body, but they do not appear as long tails.

Vine mealybug, like obscure mealybug, exudes a clear defensive fluid when threatened.

Life cycles

Grape mealybug has two generations per year: overwintering and summer generation. This mealybug

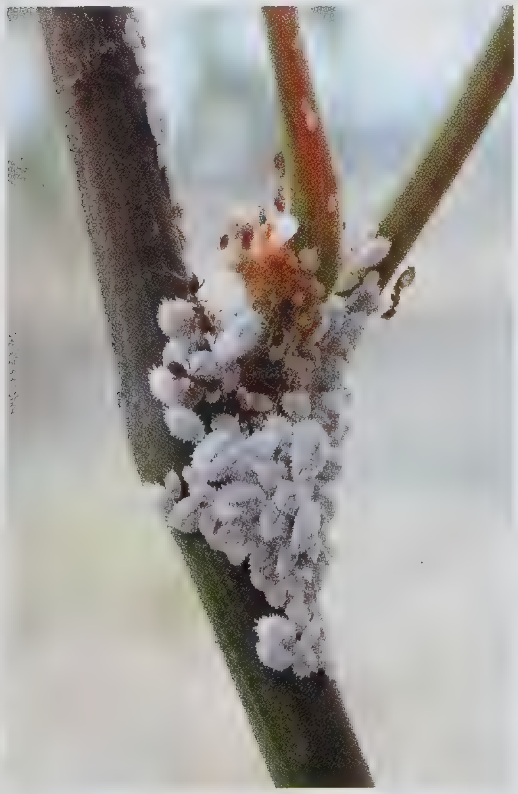
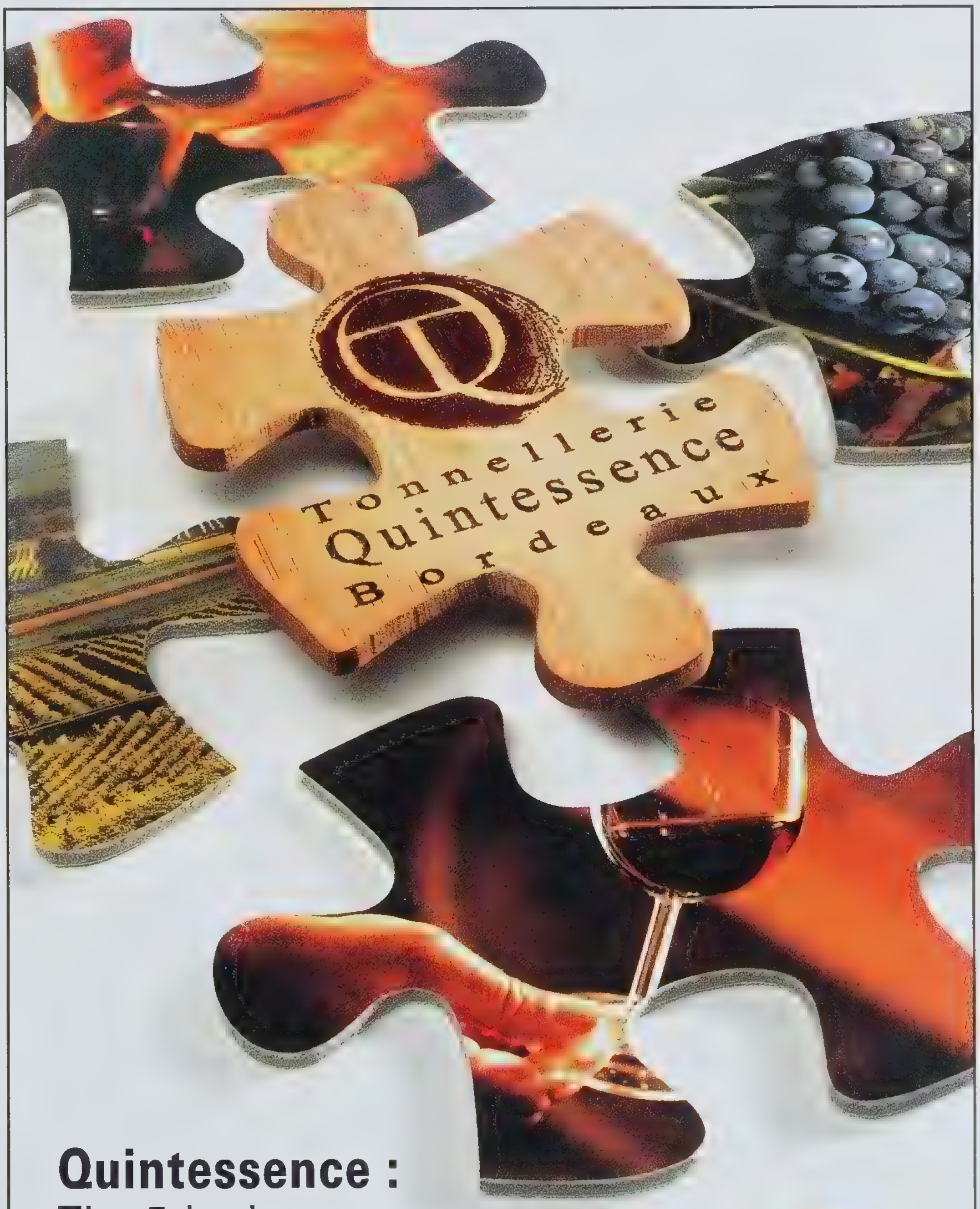


Figure IV. Vine mealybug colony in the axils of the petiole and cane (photo: Mark Battany).



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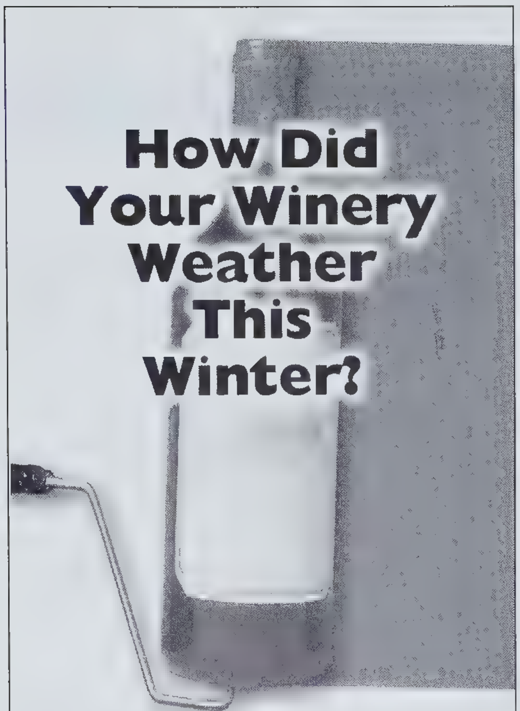

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evolved to live in temperate climates where it spends the winter in an arrested state called *diapause*. Diapause is a prolonged dormancy regulated by hormones triggered by environmental conditions. The ability to diapause, and which life stage diapauses, is genetically determined.

In grape mealybug, the egg is the most resistant stage to cold weather, thus it is this diapausing stage that overwinters. The eggs are laid in a white, cottony egg sac under the bark on the trunk, in the head of the vine or on cordons. Egg sacs are formed when the female secretes long waxy threads during oviposition. The cottony mass, called an ovisac, conceals the eggs.

In late winter the youngest nymphs (called crawlers), emerge and, shortly before bud break, they move from old wood to the spurs where they gather under the thin bark on one-year-old wood. After bud break, a portion of the population moves to the basal leaves and shoots while the rest remain under the bark primarily on the upper portion of the trunk, head, and cordons. When high grape mealybug populations exist in older vines with thick bark, they may also be found under the bark much lower on the trunk.

The overwintering generation develops through the spring, reaching maturity in late May and June. At that time, the adult female returns to the old wood to oviposit. Each female lays 100 to 300 yellow to orange eggs, then she dies. The eggs hatch in seven to 14 days.

Summer generation nymphs move to the shoots, foliage, and clusters that are touching old wood. Only eggs or crawlers are found in late June or early July; mostly immatures are seen through July. Adult females will appear in late summer and early fall. Some females will oviposit in the fruit clusters but the majority of females return to old wood to lay overwintering eggs.

Because grape mealybug has a diapausing stage, the life cycle is synchronized and the two generations do not overlap. Thus, at certain times during the growing season, specific stages are not present while others predominate. For example, the lack of females and eggs in mid to late July is a strong indication that the immature mealybugs seen on vines at that time are grape mealybug. Similarly, at bud break, only crawlers along with remaining ovisacs are found. When only one or two stages of mealybug are present at a given time, the insect is most likely grape mealybug.

OBSCURE MEALYBUG does not have a diapausing stage, thus it has all life stages present throughout the year; this distinguishes it from the grape mealybug. It has two to three overlapping generations per year and overwinters as eggs inside ovisacs and as nymphs under the bark, mostly on the upper portion of the trunk or on cordons.

In some central coast vineyards, obscure mealybug has been observed on weeds such as malva during the winter when the vines are dormant. After bud break, a portion of the nymphal population moves onto new shoots and basal leaves; however, a large number remain hidden under the bark.

In the summer, populations may increase dramatically and all stages are found on above-ground portions of the vine, specifically under the bark on the trunk, cordons, and spurs; basal portions of the shoots and leaves; and on clusters that touch older wood. In fall, nymphs migrate from the canopy to the trunk and cordons and remain on old wood under the bark.

VINE MEALYBUG, like obscure mealybug, does not diapause and all life stages might be present year-round on a vine. It has several generations per year, depending on temperature. In the San Joaquin Valley, it can have up to seven generations. In the cooler North Coast, it has approximately four.

During the winter months, eggs, crawlers, nymphs, and mated females are found under the bark. The majority of the population is found on the lower trunk at the graft union or near the soil line. They are also found in old pruning wounds on the trunk, at the crotch in a bilateral cordon-trained vine, or at the base of the spur. In light soils present in the Coachella and San Joaquin Valleys and some areas in the Central Coast, they are found on vine roots. This has not been seen in the heavier soils of the North Coast.

Reproduction slows considerably in the winter months, and by late February and March, the majority of stages found are older nymphs or fully developed females that have not started laying eggs. In late March and early April, overwintering nymphs develop into adult females which begin to lay eggs in ovisacs.

When the crawlers of the spring generation emerge, they move up the trunk, find a spot to feed and continue to develop. The spring generation develops under the bark on trunks and cordons through May and by late spring, nymphs can be found on basal leaves.

In summer, populations can increase dramatically and all stages of overlapping generations are found on canes, clusters, leaves, and petioles well above the fruit zone and under the bark on the trunk, cordons and spurs.

In the canopy, vine mealybug forms colonies in the axils of the petioles and the cane (Figure IV). Females lay eggs on all above-ground parts of the vine. Only vine mealybug lays eggs on leaves and they may be found above the fruit zone. Starting in about November, population densities decline and nymphs migrate to the lower trunk.

Timing of control measures

It is very important to time insecticide applications to coincide with periods of maximum vulnerability of each pest. Due to the different life cycle for the three species, control timing differs. For information on which chemicals to use, please consult the University of California Grape Pest Management Guidelines

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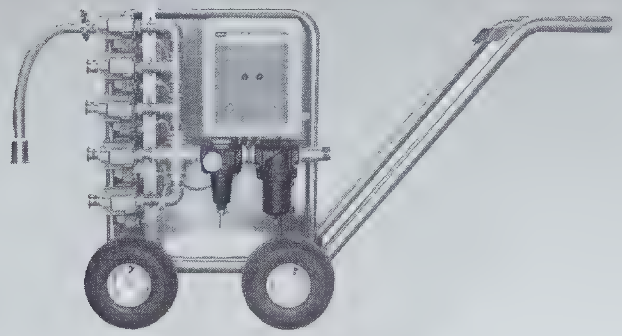

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at http://www.ipm. ucdavis.edu. There are two guidelines that address mealybugs. The titles of the two guidelines are 1) *Mealybugs (Pseudococcus)* for grape and obscure and 2) *Vine mealybug*.

GRAPE MEALYBUG: This pest is best controlled at the crawler stage. As described previously, grape mealybug is seldom a pest; control is needed only when populations are high and a high percent of the fruit touching the old wood is infested. Grape mealybug prefers vigorous vines. Keep records of infested fruit near harvest and map the infestation at that time.

The most effective treatment is to control crawlers from the overwintering generation during delayed dormancy, just prior to bud break. In vineyards with a history of infestation at harvest, monitor the spurs before bud break. Gently peel the thin bark from the tip of the spur and look for the orange-to-yellow crawlers on one spur per vine in at least 30 vines. If 20% of the spurs are infested, a treatment may be warranted.

In May, monitor the beginning of the summer generation by examining the base of spurs for mature females and for ant movement on the vine. A treatment may be needed if more than 20% of the spurs are infested in late spring.

A post-harvest application should **never** be used to control grape mealybug. Depending on the harvest date, at this time the majority of the population is in the egg stage inside the ovisac under the bark. No chemical kills the eggs, thus applying a treatment at this time will disrupt natural enemies and not control this pest.

OBSCURE MEALYBUG: The most effective treatment timing for this species is also the delayed dormant period; spurs can be monitored with a protocol similar to that listed above for grape mealybug. If additional treatments are required, systemic insecticides applied with irrigation water can be very effective in late spring, more so in vineyards with light soils.

Continued on page 125

Tipping Malbec shoots to improve set and yield

BY Bibiana Guerra, Ph.D.,
Winegrowing Research Manager
Woodbridge Winery, Woodbridge, CA

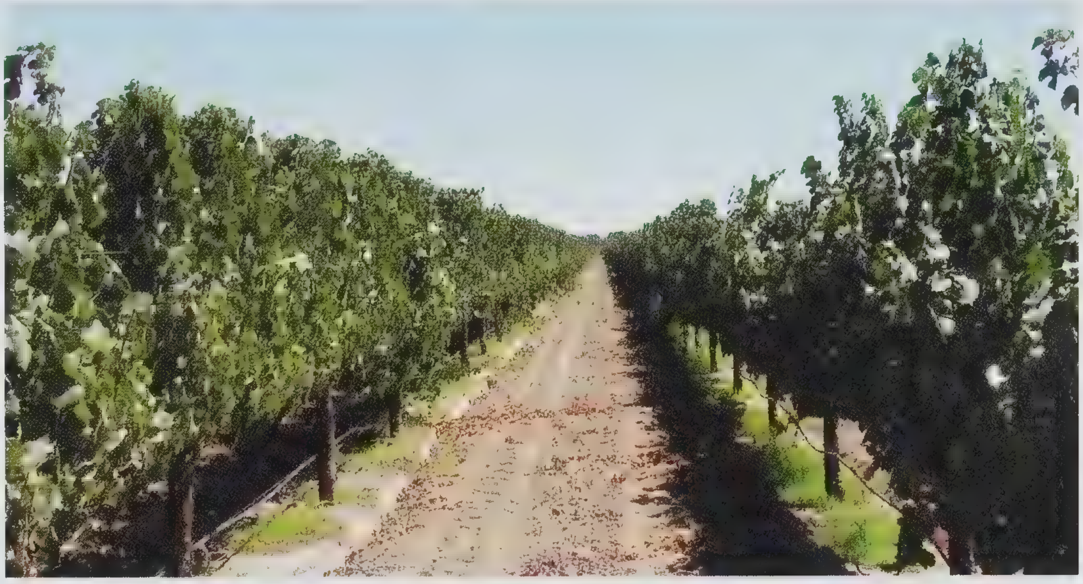

Figure I. Control vines (left) had to be hedged twice on May 28 and July 26, while tipped vines (right) did not receive any hedging throughout the season (July 2004).

Shoot-tipping has been reported to be a beneficial practice to improve set, particularly when performed at bloom time.[1] The practice is far from original. Respected viticulturists such as H. Muller-Thurgau, L. Ravaz, and J. Branas, successfully used tipping in the early 1900s, in varieties such as Clairette and Pinot Noir.[2] More recently, Bryan Coombe in Australia, and R. Naito in Japan, reported improved yields through the use of tipping in Grenache and Kyoho, respectively.[1,2]

Even though tipping is not widespread in California vineyards, it remains a common practice in viticultural regions such as Bordeaux, where repeated mechanical tippings or "rognages" occur throughout the growing season. Below are the results of three years of shoot-tipping in a Malbec vineyard (Lodi, CA).

Tipping or topping?

With the multitude of terms referring to green-pruning operations, there is a lack of agreement on how to define tipping. Frequently, "tipping" is the removal of the top one to three inches of growth, including one or two small, expanded leaves. "Topping" is the removal of four or more inches, nor-

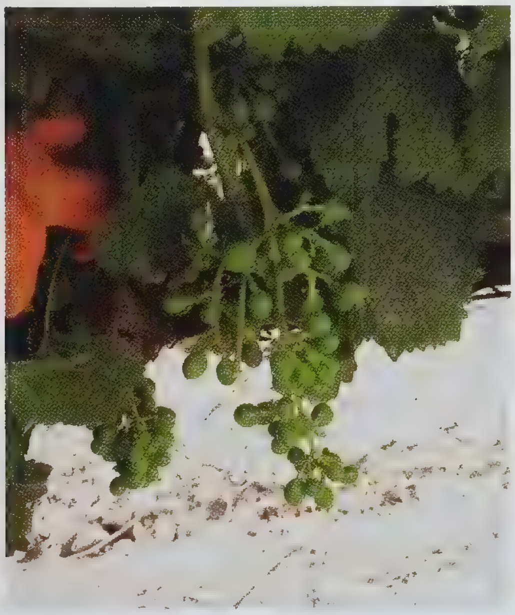

Figure IIa. Example of cluster on control vine at pea-size stage (May 28).

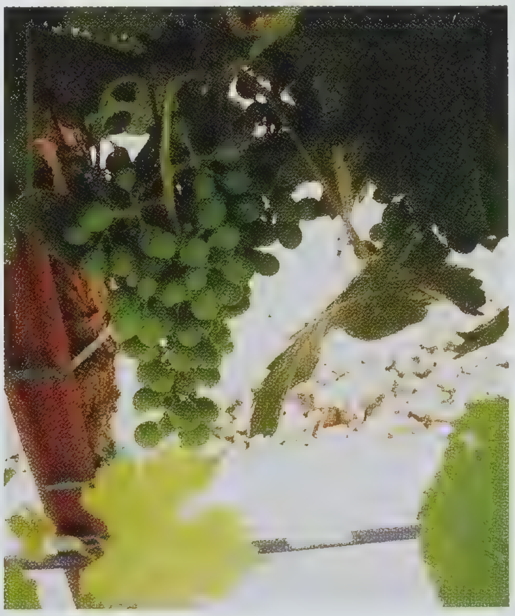

Figure IIb. Example of cluster on tipped vine at pea-size stage (May 28).

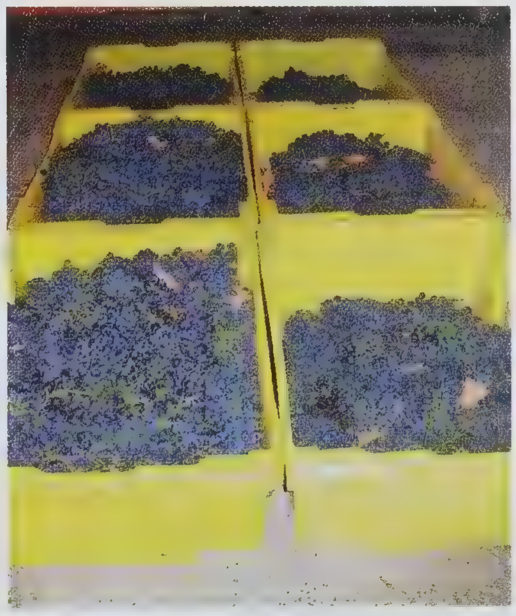

Figure IIc. Clusters from tipped vines (left) and control vines (right) at harvest time. Each yellow bin contains the crop of two vines (August 19).

Table I: Tipping dates for the three years of the trial.

Year	Estimated 50% bloom	1st Tipping	2nd Tipping
2002	May 17	May 15	May 21
2003	May 25	May 20	May 30
2004	May 6	April 28	May 11

Table II: Yield data for the three years of the trial.*

		PEA SIZE		HARVEST			
		Cluster Count	Cluster weight (lb)	Cluster Count	Cluster weight (lb)	Yield (lb/vine)	Yield (tons/acre)
2002	CONTROL	137 (100%) a	0.04 a	156 (100%) a	0.16 a	21.1	5.9 (100%)
	TIPPED	167 (122%) b	0.06 b	195 (125%) b	0.16 a	22.9	6.4 (108%)
2003	CONTROL	114 (100%) a	0.03 a	101 (100%) a	0.13 a	10.9	3.0 (100%)
	TIPPED	129 (113%) b	0.05 b	135 (134%) b	0.19 b	20.0	5.6 (184%)
2004	CONTROL	92 (100%) a	0.07 a	92 (100%) a	0.11 a	15.7	4.4 (100%)
	TIPPED	126 (137%) b	0.08 b	161 (148%) b	0.13 b	26.1	7.3 (166%)

* Numbers with the same letter not statistically significant, $p<0.05$. Yield components are average of 12 values from evenly distributed vines.

mally involving four or more leaves. When tipping is strictly restricted to the apical tip, the term "pinching" is often preferred. Tipping is normally done manually, whereas topping is often done mechanically.

Studies have shown increased lateral growth — and sometimes increased second crop — following topping. But these effects are minimized after tipping. Thus, the distinction between "tipping" and "topping" seems justified. Since "hedging" refers to removal of several internodes on either the top or sides of a vine, topping is equivalent to top-hedging, whereas "skirting" is a side-hedging. Whenever tipping or topping occurs, the next apical bud takes over, growing more or less rapidly (depending on vine status), to soon restore a new growing tip.

Role of timing and vigor

Timing is a factor that greatly affects the response to tipping, as is the case with most viticultural operations. Tipping has the greatest impact during bloom. Studies have reported a lack of response when performed at other phenological stages.[3] In one study, shoots were successfully tipped one week before bloom.[1] In a related study involving topping, Coombe narrowed down the target to one week, and recommended performing the operation at 50% bloom.[8]

Vine vigor also seems to be an important factor in determining the response to tipping. When vines do not grow vigorously, tipping has little or no effect. Furthermore, tipping has been reported to be detrimental to weak vines (Thomas and Barnard, 1937, quoted by Coombe[2]). This was the result obtained in 2004 when we attempted to tip young, medium-vigor Merlot vines. For this reason, tipping should be considered only in medium- to high-vigor situations.

Historically, high vigor has been associated with poor set. It has been suggested that shoot vigor may actually be responsible for regulating set in seeded berries. The more vigorous a shoot is, the more incomplete the fertilization, and the poorer the set. Supporting this hypothesis is the observation that vigorous shoots have fewer pollen tubes and slower rates of tube elongation than do weak shoots.[1] Several non-seeded grapes have been associated with vigorous shoots. Consistently, these seedless cultivars have been shown to be particularly responsive to tipping as a tool to improve set.

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Table III: Juice and wine analysis for the two vintages that wine was made.

		JUICE*					WINE*						
		Harvest date	Brix	TA (g/l)	pH	Malic acid (g/l)	Alcohol (%v/v)	Tartaric acid added (g/l)	TA (g/l)	pH	VA (g/l)	Hue (A420/ A520)	Intensity (A420+ A520)
2003	CONTROL	10/9	23.0	5.1	4.10	1.73	12.0	3.2	4.9	3.88	0.72	0.67	5.2
	TIPPED	10/9	23.0	4.8	4.09	1.54	12.4	3.1	4.7	3.84	0.72	0.70	4.6
2004	CONTROL	8/26	23.8	6.6	3.85	3.13	12.6	1.5	6.6	3.66	0.77	0.61	7.3
	TIPPED	8/26	22.8	6.5	3.75	2.89	11.8	2.0	6.6	3.71	0.78	0.62	5.4

* Juice and Wine data are averages of two analyses.

Tipping seems to function similarly to a growth retardant. Several anti-growth hormones (ethephon, chloroethyl trimethylammonium chloride [CCC], succinic acid dimethyl hydrazine [SADH]) have all decreased canopy size and increased set, the same effects we obtain when we tip.[1,3,7] This further reinforces the inverse relationship between shoot vigor and set.

Malbec trial description

After several years of low yields (3.3 T/A average in 2001, 3.8 in 2000, 2.5 in 1999, and 2.4 in 1998), the economical viability of Malbec in the Lodi area was being questioned. The tipping trial was designed to try to improve set in Malbec. The trial was conducted in 2002, 2003, and 2004, in a site with particularly poor historical yields.

The research plot consisted of three replications per treatment for a total of six sub-plots, involving a total of 3.2 acres in San Joaquin loam soil. Treatments were randomly distributed within plots. The site was planted in 1998 to clone 4 of Malbec, grafted to 5C rootstock. Vine spacing is 8x10 ft in east-west rows. Vines are trained to a bilateral cordon with spurs on a VSP trellis.

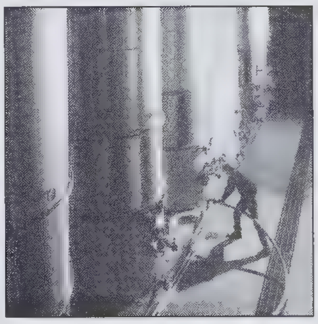
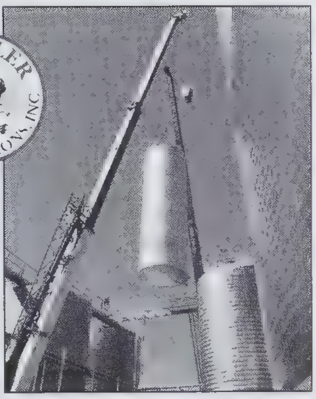
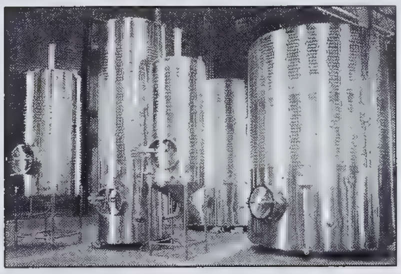
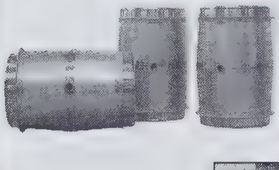
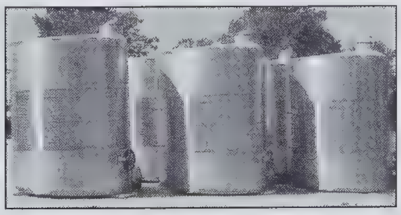
Timing of tipping just before bloom was challenging in the first year of the trial, when historical bloom dates were lacking for the site. To ensure that tipping would happen at the right time, the decision was made to perform two tippings narrowly spaced, with the potential added benefit of magnifying the response.

Waiting for the first caliptras to fall (5% to 10% bloom) before performing the first tipping, and then repeating the tipping when just a few remained in place (80% to 90% bloom) turned out to be a very useful and consistent trigger in subsequent years of the trial. This translated into an approximate 10-day interval between tipping dates (Table I). The tipping operation was performed with hand-held pruners, to make as many cuts as necessary to avoid removing more than three inches of shoots (Figure III). It took approximately five man-hours to manually tip one acre (544 vines).

Impact on vine canopy

Tipping produced dramatically smaller vines throughout the season (Figure IV). These vines did not require any hedging, or much further manipulation other than one wire movement. The control vines, on the other hand, had to be topped as early as May, and then again in July (Figure I).

Tipping also affected the need and timing for wire movements. Whereas the shoots in control vines were long enough to receive a second wire movement early in the season, shoots of tipped vines did not need this operation, and their canopies remained wider and more open for the rest of the season. Thus, after the initial investment in the

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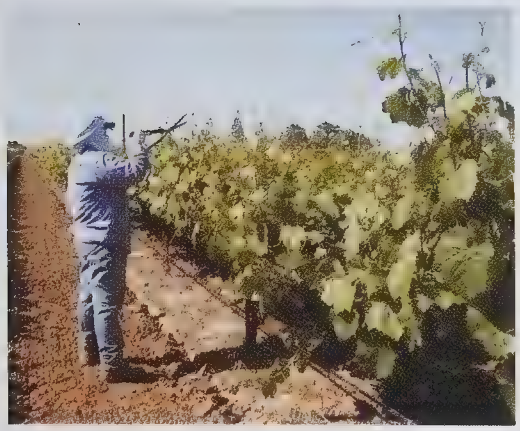

Figure III. Tipping removed one to three inches of apical growth at 5 to 10%, and again at 90% bloom (May 2003).

tipping operation, the tipped vines were very labor-efficient, saving both hedging and wire movements.

Impact on yield

Tipping had the largest effect on yield we have observed in response to a single canopy management operation. Even though the first year of the trial showed some yield increase (6.4 T/A against 5.9 T/A in the control, an 8% increase), the effect became dramatic in the second and third years (84% and 66% increase, respectively). This confirms reports that the tipping effect is cumulative.

The small response in the first year might have resulted from the fact that much of the 2002 crop had already been determined when tipping occurred in May, 2002. Data was collected on two components of yield: number and weight of clusters (see Table II).

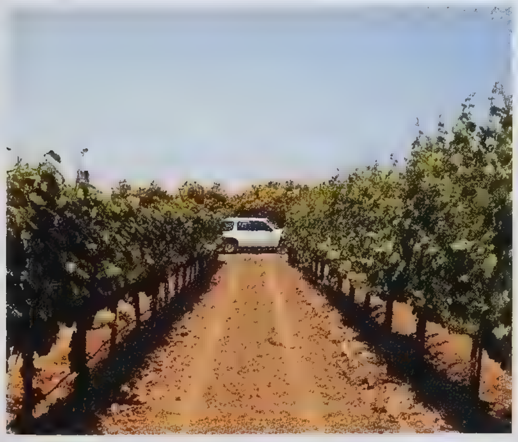

Figure IV. Tipped vines (left) have not reached the second wire, while control vines (right) have grown well past it (May 2003, two weeks after second tipping).

Cluster counts and cluster weights were collected for each replication twice per season: at pea size and right before harvest. These data showed that in year-1 of the trial, the small increase in yield was due to an increase in cluster number.

Replicated measurements of rachis and individual berries failed to show any significant difference in cluster weight between treatments in the first year (data not shown). In years 2 and 3, both cluster number and cluster weights were affected, with both berry

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number and berry weight increasing significantly for the tipped vines (Figure II, Table II).

Juice / wine quality

In two of the three trial years, the tipped treatment showed lower Brix than the control on the same picking day, even though both were able to reach satisfactory maturity (Table III). This may be accounted for by the approximately 70% higher crop from tipped vines. Impact on TA or pH was negligible.

Wine from the two treatments (60 gallons) was made for two of three years of the trial. The alcohols in the wine followed the Brix differences in the juice. Color intensity (A420+A520) was lower for the tipped wine, which is again in agreement with the higher yield of the corresponding vines. However, the color of the tipped-treatment wine was still intense, with a deep purple hue characteristic of the variety. No other important differences were observed between wines.

Future

Yield increases from tipped vines in all three years of the trial exceeded expectations, and the trial was discontinued for 2005. The grower plans to adopt shoot tipping as part of his farming, and apply it to this and other Malbec sites.

Even though our goal was met, the magnitude of the response took us by surprise and raised many interesting questions. One logical next step is to find out how much of the response observed is site-specific, and how much variety-specific. To this end, we are repeating the trial on a Merlot vineyard of matching vigor characteristics. Other factors such as clone, vineyard site, performing one tipping compared to multiple tippings, and timing of the tipping all remain to be tested.

As we get ready to tip more acreage, we would prefer to mechanize the tipping operation. Mechanical hedgers, weed-eaters, water jets and leaf-blowers all have been suggested as possible aids in removing shoot tips.

We are aware of how little is known about the underlying physiological mechanism involved in the tipping response. Several explanations (not necessarily mutually exclusive) have been proposed. Given the similarity in response between tipping and growth inhibitors, one theory is that eliminating the apical tips might involve the elimination of growth-stimulating hormones, thus shifting a delicate balance towards a prevalence of growth suppressors.

Others have suggested that tipping removes sinks (growing tips and unex-

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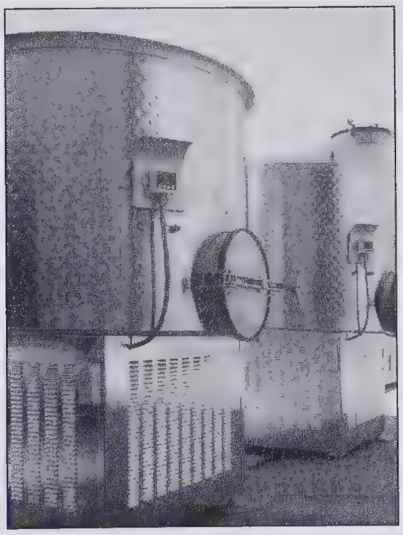

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panded small leaves), thus reducing competition for photosynthates which would then become further available for the clusters. Supporting this hypothesis is the finding that radioactively-labeled photosynthates traveled upwards from an exporting leaf towards the tip. But when the tip was removed, the direction of movement was reversed.[6]

It has also been suggested that extra assimilates may be newly synthesized as a result of a net greater photosynthetic area, due to some stimulation of lateral growth during tipping.

Finally, the observation that weak shoots produce more pollen tubes than strong shoots is particularly interesting. This inverse relationship between shoot vigor and percentage set might be part of a survival mechanism of the vine. It might be advantageous for vines not growing enough (weak shoots) to invest in a more efficient pollination (more pollen tubes reaching the ovules), thus, in turn, improving set, fruit, and seed output. ■

Woodbridge Winery appreciates the collaboration of Jon Wetmore of Round Valley Ranches in the tipping trial. The author wishes to thank Woodbridge winemaker Erick Schultz for his help in the vineyard.

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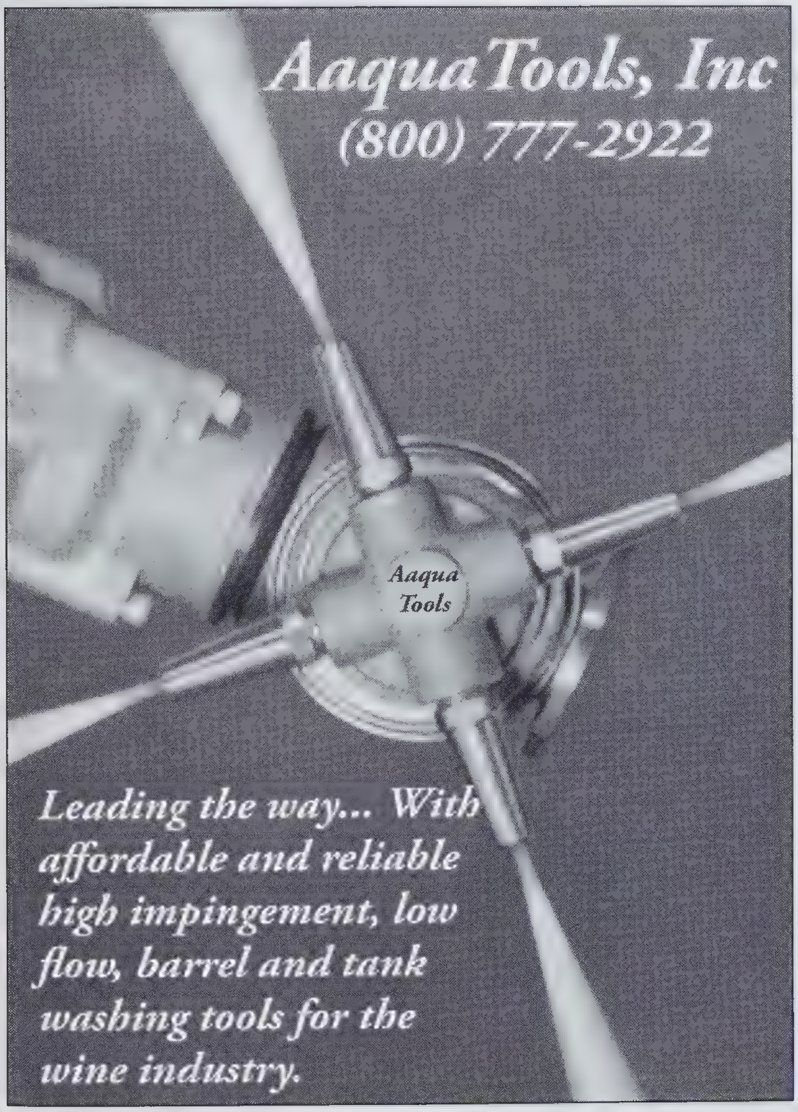
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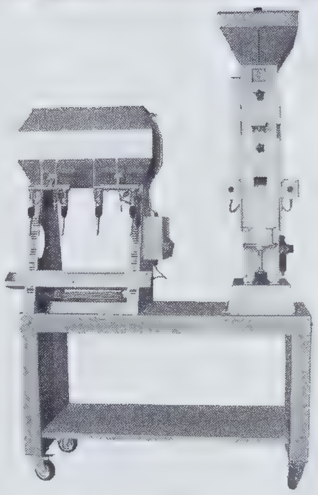

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BY Carol Caldwell-Ewart

How do you replant the vineyard that produces the oldest vineyard-designated Cabernet Sauvignon in Sonoma County, CA. Very carefully.

First planted in 1971, Alexander's Crown Vineyard is comprised of six vineyard blocks, totaling 70 acres, which encircle a knoll that rises from the east bank of the Russian River in Alexander Valley (Sonoma County, CA). At the heart of the circle, atop the knoll, lives Rodney Strong, founder of Rodney Strong Vineyards (RSV), which produces the estate-bottled Cabernet Sauvignon from Alexander's Crown. The current 2001 vintage sells for $30 retail.

"Rod immediately identified the Crown as something special and kept the fruit separate from year one," says Doug McIlroy, director of grower and vineyard operations for RSV. "What makes the vineyard special is the uniqueness of the site. The first thing you notice is the aspect — every block has a different aspect — and there's the diversity of soils."

Soil diversity and seasonal consistency combine to make the vineyard great, McIlroy believes. "You get consistency seasonally from the aspect. In a hot year, the north- and east-facing slopes mature later and give you that later-maturing type flavor. Then in the cool years, it goes the opposite way, when the south- and west-facing slopes mature later."

From the beginning, the focus was Cabernet Sauvignon, though a few acres were planted to Merlot and Cabernet Franc. After 20 years, though, the vineyard blocks were beginning to deteriorate. Many vines were virused, and some blocks could not maintain the quality necessary to make them consistently part of the vineyard-designated wine. Replanting was critical, and that slow process began in 1992.

"We had to keep the vineyard and the wine program alive, so we had to gradually work around the Crown, replacing a little at a time," McIlroy explains. "It was a 12-year process because we wanted to keep the case volume pretty similar, and we hope, have consistent wine quality, too." Replanting has produced 63 acres of Cabernet Sauvignon, 2.5 of Merlot, and five of Cabernet Franc, and the final replanting was completed in spring 2004.

McIlroy grew up raising grapes on a family ranch in Russian River Valley and managed that ranch after high school until leaving to study viticulture at UC Davis in the mid-1980s. After graduation, he worked in grower relations at Fetzer Vineyards and Kendall-Jackson before coming to RSV in April 2001, where he oversees more than 900 acres of winery-owned vineyards and more than 35 growers.

"My farming philosophy is that each block has a maximum potential for quality (depending on the age of the vineyard), and it is the viticulturalist's job to find it," says McIlroy. "You use your vineyard inputs to find the peak quality and yield. I believe that New World *terroir* is not just soil and climate, but also the viticultural inputs. In France, the winemaking and the viticultural inputs are pretty tried and true, but there's more to learn here in the New World with respect to what grows best, where, and on what soils."

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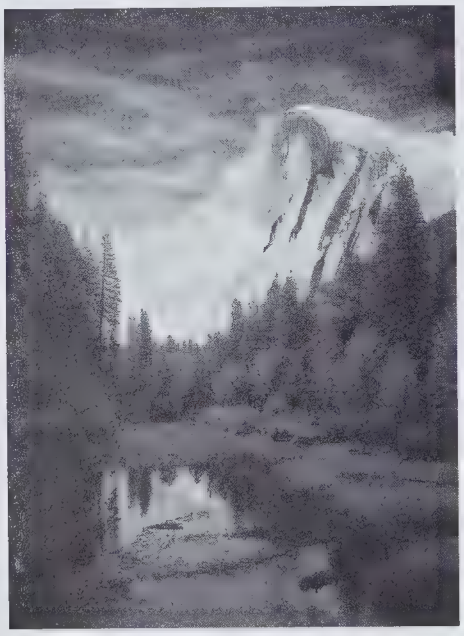

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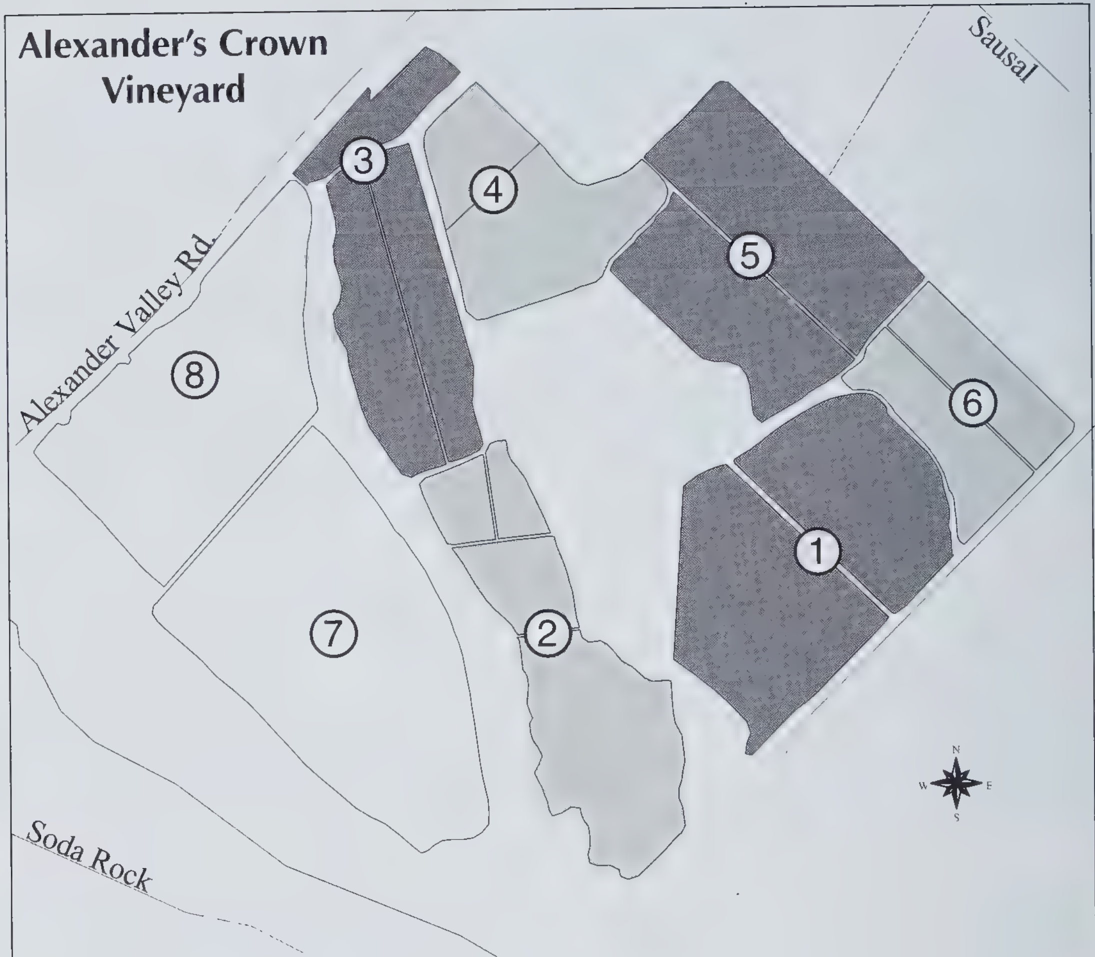

Elevation of vineyard: 170 to 365 feet

Block #1: 17 acres Cabernet Sauvignon spaced 8x5 on 101-14 rootstock
Block #2: 2.4 acres Cabernet Sauvignon 10x6 on 101-14;
2.6 acres Cabernet Sauvignon 10x6 on St. George;
8 acres Cabernet Sauvignon 10x8 on 5C
Block #3: 2.5 acres Merlot 10x7 on 039-16;
5 acres Cabernet Franc 10x6 on 101-14;
4.3 acres grafted to Sauvignon Blanc
Block #4: 2 acres Cabernet Sauvignon 10x7 on 5C;
7 acres Cabernet Sauvignon 10x7 on 110R
Block #5: 9 acres 10x6 on 101-14;
7 acres 10x6 on St. George
Block #6: 4.4 acres 10x6 on 101-14;
3.6 10x6 on 110R
Blocks #7 and #8: Sauvignon Blanc

When McIlroy joined RSV, improving the Crown vineyard was his first task. "My focus was on five Cabernet Sauvignon blocks," he says (see Figure I). "I wanted to get blocks that hadn't recently been included in the blend back in there." He first turned his attention to the soil. "When I get in the vineyard, my eyes gravitate toward the ground, and I always wonder what's underneath.

"I felt that how we were farming, with respect to soil, needed more attention to detail." He began by digging 14 backhoe pits "to verify what types of soils we had, what depth they were, what the effective rooting depth was, and what amendments the blocks might need to bring them back into the program."

McIlroy learned that there are five different soils in Alexander's Crown, and often they don't correspond to soils maps. "The predominant, highest quality soil is Positas gravely loam," which is in blocks 1, 5, and 6. "It is a well-drained gravely loam with clay subsoil. Deep reddish brown, it is acidic and has some sedimentary and volcanic aspects. We found some tuft in there also," he recalls.

Block 2 is Clough gravelly loam, which has lots of gravel and hardpan. Blocks 3 and a portion of 4 and 5 have Clearlake clay, which is sedimentary pond bottom. Block 4 also has Pleasanton gravelly loam, which has hardpan and lots of gravel like the Clough. The fifth soil type is Yolo silt loam overwash in Block 3.

"The backhoe pits showed us why we had such low vigor in certain blocks. The Pleasanton soils and Clough soils in Blocks 2 and 4 have a hardpan in them. We could see that the vigor was down in there, and we wanted to know why."

McIlroy has refined RSV's viticultural practices according to what he learned about the soils from the backhoe pits. The blocks with Clearlake clays were the most problematic. "We basically learned that the effective rooting depth was shallower than we had thought on those clays. So we refined our irrigation using shorter durations. We could see on the surface where the clear soil breaks were, but we had to verify that with the backhoe to see how deep they were."

Under RSV's direction, Vino Farms, a vineyard management company based in Lodi, CA, which manages vineyards in several California wine counties, applied composted pomace and gypsum to the vineyard blocks with Clearlake clays. "I was not looking for nitrogen from composted pomace," explains McIlroy. "I want to add organic matter."

They applied three to four tons per acre of composted red grape pomace (no white grapes or stems) in May after McIlroy arrived. "We intend to come back and do it again. It's an ongoing process, because those soils are going to close up again."

The Clearlake clays also received as much as 10 tons per acre of gypsum, "but we had to be careful because, in some cases, there were pretty high magnesium levels (50% to 75%), and there was also a high (30 to 40 meq/100g) cation exchange capacity (CEC). We were trying to counter the high magnesium with gypsum that also has some beneficial effects on clay. However, you must be careful about how much calcium you put on soils with a high CEC, because of salt build-up."

These soils were ripped 18 to 24 inches deep down the tractor row. "We tried to do the ripping when the ground was still somewhat moist," McIlroy says, in late spring or early summer. "It's basically a timing issue. If you do it too soon, you get streaking, and if you do it too late, head-sized clods come up. The idea was to get as much fracturing away from that ripping process, to open up the ground and get the gypsum that had been applied recently worked in there, too."

As a result of these block enhancement efforts, the 2003 vintage of Alexander's Crown Vineyard Cabernet Sauvignon was the first in many years to include all blocks in the vineyard.

Choosing new rootstocks and clones

The original plantings at Alexander's Crown were on St. George rootstock spaced 8x12. New plantings are 110R, 101-14, and 5C rootstock, and vines are spaced 5x8 and 6x10.

"5C was one of the more available rootstocks when it was planted [in 1992]," explains McIlroy. "The choices were not as broad as they are today. Later on, we had more choices, and we have been planting 101-14 on acidic loamy, volcanic soils. These were in Blocks 5 and 6, planted in 1999, and Block 1, planted in 2004."

Sugar beet lime was added to these soils at five tons per acre (TPA) to raise the pH and to increase available phosphorous content.

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"When you want to raise the pH and minimize the amount of calcium that integrates into the soil, you choose lime," says McIlroy. "Mined lime has more of an impact on the total calcium than sugar beet lime does, which can lead to magnesium deficiencies if the calcium gets too high.

"If you have too low a pH, you get into a situation where phosphorous becomes unavailable, and if you don't have phosphorous, the vineyard won't mature. The target is 5.5 to 6, but some of these pHs were below 5, especially in Block 1," he observes.

McIlroy adds that 101-14 rootstock has a reputation for producing good quality wines and dealing with acidic soils very well. "When you try to adjust the acidity of those soils, you can do that to maybe 18 to 24 inches, and 101-14 is a shallow rootstock, so it will thrive in the soils where the pH has been adjusted. Acidic soils can give better quality because they add another level of stress to the vine from a nutrient viewpoint. But you don't want to stress them too much."

110R is planted in the Clearlake clay soils.

None of the original grapevines were salvaged for the new plantings. "Some of the replanting decisions were made before I arrived," explains McIlroy, "but I would have done the same thing. I would have selected new certified clones, as opposed to preserving the old virused material. Preserving them would have been a poor economic choice and a poor winemaking decision as well."

New Cabernet Sauvignon clones are 7, 337, and 4. "We have the 337, which is an earlier ripening clone on the east-facing side of the ranch, and we have Clone 7 on the southwest-facing side, but Clone 4 is right up at the crown, and that works out well for us with respect to the maturity of those clones. Clone 4 adds a little diversity. It is the workhorse clone in Napa Valley and is starting to be used more in Sonoma County. It brings a little more to the spice rack.

"The Merlot clone is 181, and the Cabernet Franc is Clone 312, which we have discovered might have some leafroll virus."

Rebuilding Block 1

The 16 acres of Block 1 were the last of the Crown to be replanted, finishing up in June 2004 with Clone 4 on 101-14. "Block1 is the best block, with the best

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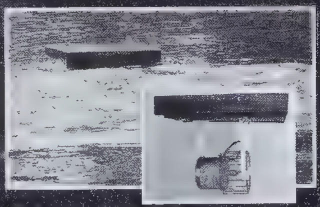

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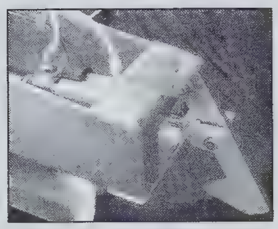

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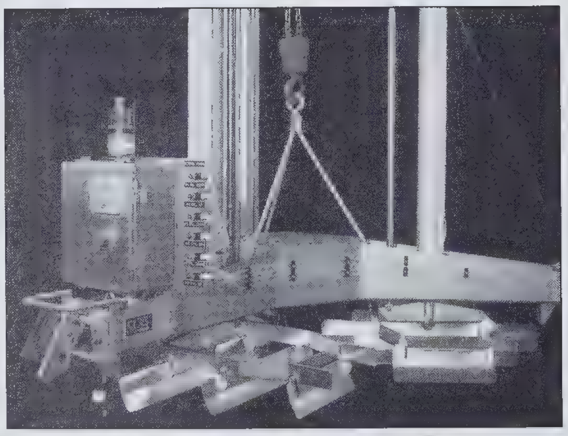

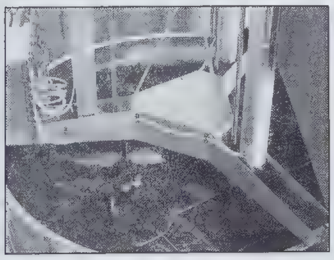

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soils," explains McIlroy. "It was the last thing we replanted because we wanted to hang on to the last of the best quality, original planting to keep the program alive.

"It was a ground-up overhaul. We limed it (with sugar beet lime because the calcium/magnesium ratio was high (as much as 4:1). We ripped it in late May (as opposed to in the fall) when the ground had dried to 24 inches and only ripped to 30 inches because that's where we were looking to integrate the lime, that was the depth of the soil profile, and we believed, that was going to be the effective rooting depth. We changed the spacing from 8x12 to 5x8."

The larger half of Block 1 is primarily west-facing, and the rows originally ran from southwest to northeast. "We turned the rows a little bit more to the west to get the sun over the top of the vines in the afternoon. Because we are more concerned with mitigating the slope in the other half of the block, it remains southwest by northeast to best accommodate potential erosion on the slope."

Trellis choices

McIlroy reports that all of the blocks except Block 6 have vertical shoot-positioned (VSP) trellis. "Block 6, planted in 1992, is a sprawl vineyard," he says. "We haven't yet converted it to VSP. In the Alexander Valley, there is some benefit to sprawl in that it does shade the fruit. I think we're finding that, with VSP, sometimes the fruit is a little bit too exposed."

Depending upon the number of lateral shoots, a little leaf removal may be done on the morning side of vines, but that is seasonally-dependent, for the most part, they don't pull leaves. "We haven't decided yet whether to convert Block 6 to VSP. We might even consider converting some of the more exposed blocks to sprawl for additional shading."

Managing irrigation

The greatest value McIlroy says he derived from the backhoe pits was help with fine-tuning irrigation. "Backhoe pits told us what was going on at lower depths and that helped us define the effective rooting depth," he explains. In Block 2, for example, after discovering the cemented, hardpan layer, more frequent irrigations of shorter duration were scheduled.

Though deficit irrigation is practiced, he is careful about when it is initiated. "We're not afraid of watering post-veraison to keep the vine accumulating sugar physiologically before it dehydrates. I think many people shut water off prematurely in veraison and then the fruit dehydrates before it is physiologically ripe. If you start that process too soon, then you end up with a vineyard that's picked before the flavors have matured."

There are six neutron probe sites in the vineyard to monitor soil moisture level. McIlroy's staff does pressure chamber readings weekly, and Vino Farms monitors the neutron probes to maintain the desired soil moisture level. Neutron probes are used in lieu of measuring evapotranspiration.

Each vine has a one-gallon emitter, and in shallow soils, the vines receive two four- to six-hour irrigations per week. Vines in deeper, loamy soils receive one six- to eight- hour session per week. "I sit in on decisions about when we irrigate and how much," says McIlroy. "All irrigation events are adjusted according to weather conditions and pressure chamber readings, neutron probe results, and soil types.

"We initiate deficit irrigation between buckshot or 10 days post-set and two to three weeks pre-veraison,

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Making the wine

RSV winemaker and vice president Rick Sayre has been making Alexander's Crown Vineyard Estate Bottled Cabernet Sauvignon since he joined the winery in 1979. He began making wine from the vineyard blocks separately in 1981.

"I could see there was a lot of variation," recalls Sayre, "but I had to keep it separate to see where things were. Block 1 was always the best part of the vineyard, but when the vines were planted, there wasn't any certified material around, so most of the vineyard did have virus and most of it was on St. George rootstock."

Sayre characterizes this Cabernet Sauvignon as an Old-World-style wine. "The Crown has never been our big block-buster, knock your sox off Cab. It's always been more of a Bordeaux-like wine," explains Sayre. "We usually harvest it at a lower sugar, and it has lower alcohol. It's a little bit leaner in body than some of our other Cabs, but it has some interesting complexity. We get that complexity from the vineyard and from the way we manage fermentation."

Sayre notes that the Crown is one of four Cabernet Sauvignons that RSV makes. "We have to differentiate those. We use winemaking to accentuate what the site naturally provides. Block 1 has been indicative of more Old World, with high pH, somewhat high TA, lower alcohol, and that slightly leaner, firmer mouthfeel. It will be interesting to see how replanting changes the overall blend."

Sayre believes that the vineyard has the components to maintain the style and quality. "The volume of Block 1 has been decreasing every year, and the volume of the other blocks has increased. Younger vines definitely have more strength to them. We've been doing this piece by piece over a long period of time, so I think the consistency will be there. This is the wine we look to for complexity and a little lighter character."

Considering harvest parameters, Sayre says, "Our criteria for ripeness and maturity are changing. We are building a database. We know that certain areas of the vineyard now are more vigorous, so we need to keep those separate. If we're trying to get rid of the vegetative characters, we pick them quite a bit

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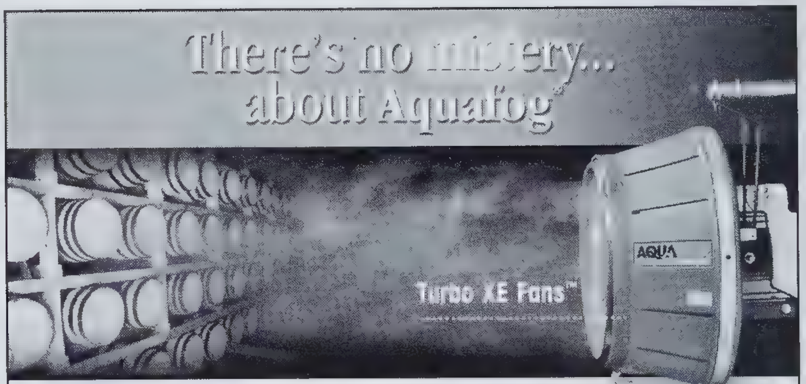

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riper — and we do that in one area in Block 2.

“Doug and I meet together every day when samples from the vineyards are coming in. We taste the buckets, we talk about maturity and what’s best suited for each sample and determine the picking decision from that. We taste for tannin maturity, we look at the seeds and stems; we taste for flavors. It’s putting it in your mouth, your nose in the bucket and looking at the fruit, it has a certain look about it, a certain taste about it.”

“It’s an Old World wine,” says McIlroy, “but the viticulture is becoming somewhat New World. The winemaking is going to preserve the Old World character, but it seems like there’s going to be no stopping it. As Sayre says, it’s going to evolve and change as a result of the modifications we have made.”

The Crown blending components spend 18 to 20 months in barrel, often going right from fermentor to oak. “Typically, we set out to keep it 60% to 70% French oak and the balance American oak,” Sayre says, “but through the sorting process, we’ll kick out some components, so there’s no true recipe. We’ve got about 30 different barrel groups.”

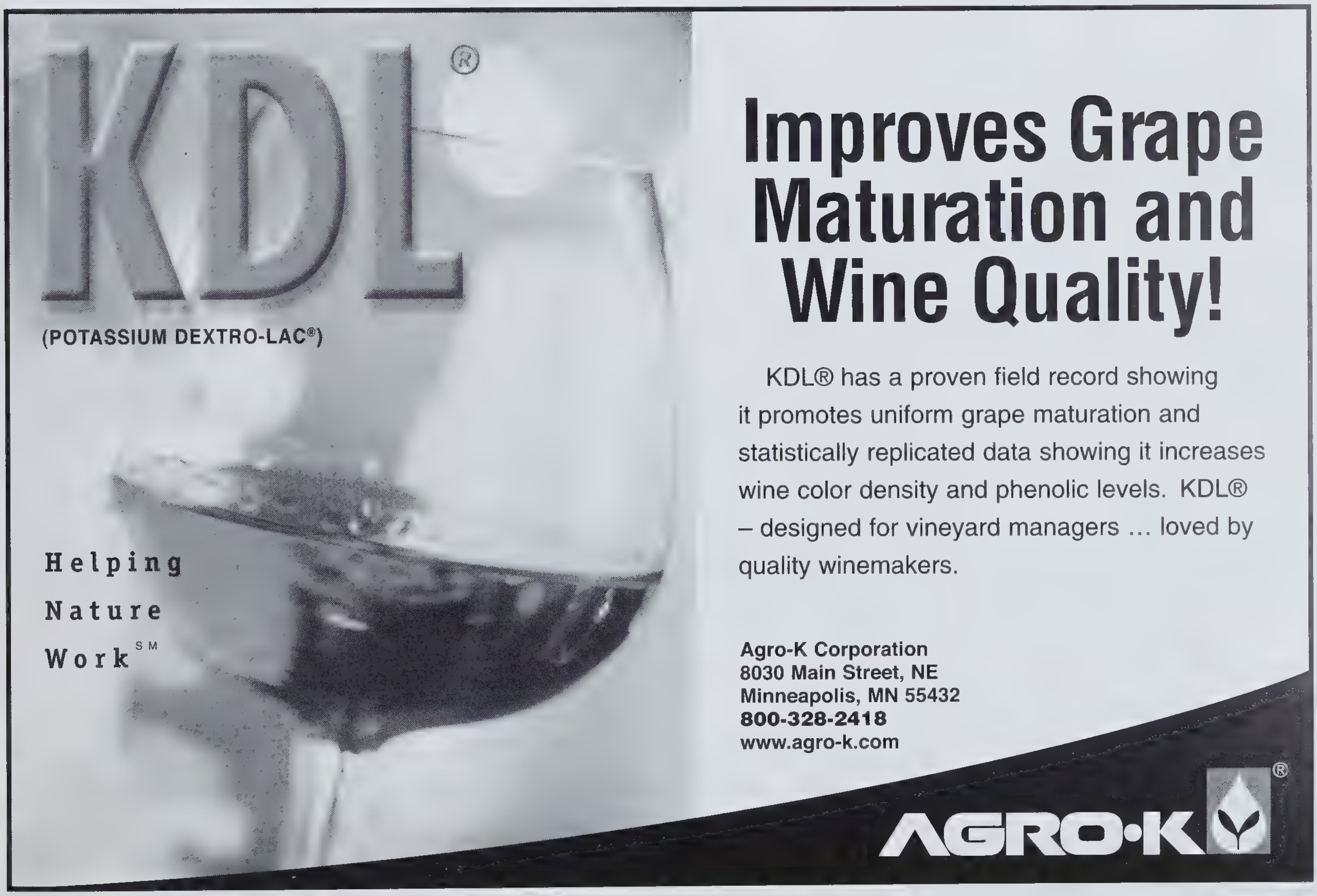
Until 1994, the Crown was 100% Cabernet Sauvignon, but since then it has often contained Merlot or Cabernet Franc, though not always.

The winemakers use several different yeasts, and some components get delayed inoculation. “If you have a delayed inoculation, you probably have a combination of indigenous yeast plus the yeast you put in there,” explains Sayre. “Plus, we use a very low inoculum. Sometimes we do have stuck fermentations, particularly with components from the old, virused vines. Getting them to finish has always been a little problematic. We use a little Prise de Mousse. For the rest, we use yeast that enhance the fruit. We always add yeast to be sure that the fermentation will eventually go dry.”

The Crown ages one year minimum in the bottle before release.

Sayre adds that the volume of Crown wine has varied more than any other wine RSV makes, “because the vineyard is so sensitive at bloom, we’ve had as low as 1.5 TPA in 1990 to 4.5 TPA in 1997, which was our best vintage. We’re projecting 10,000 cases for 2003, but it’s been as little as 5,000 and as high as 12,000.”

“Making a complex wine like the Crown is not easy,” considers Sayre, “because you’re focusing on making each block its own separate identity.



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Instead of just one vineyard, you're looking at each block and tailor-making those wines that best reflect what that wine can do, and then in the long-run you still have the opportunity to pick and choose what goes into the final blend."

Historically, as much as 40% of the components available from the Crown vineyard haven't made it into the blend. According to Sayre, "It's never our goal for all of it to make it. But it is the challenge of the viticulture and the winemaking teams to knock that 40% down as far as possible."

Ultimately, the two predict, some of the blocks — the Cabernet on Clearlake clay in Block 4, for example — may never warrant inclusion in the Crown wine. Some of the Merlot on Clearlake clay has been grafted to Sauvignon Blanc.

Sayre has some regret about losing the old vines in Block 1. "Block 1 was our best Cabernet, and we have no idea where it came from," says Sayre. "It made some outstanding wine. I think you could debate that a degree of virus definitely gives you more hang time and wines with lower alcohol. We now have all these super clones, and that's why everyone is harvesting at ripe sugars. You get sugar accumulation so quickly before you have maturity, whereas the virus was holding it back in the past. It's interesting. We talk about this quite a bit — maybe we ought to get a little virus back in the vineyard!"

McIlroy chuckles: "But you'd definitely rather make outstanding wine through other viticultural inputs than virus." ■

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California winery ensures wine quality with new cross-flow filter installation

BY Don Neel

In search of a durable and cost-effective filtration system capable of providing high quality wine on a consistent basis, Woodbridge Winery (a recently acquired subsidiary of the world's largest wine producer, Constellation Wines), began to investigate new filtration technologies in the late 1980s for young red wines. To ensure more reliable and cost effective filtration, the company sought to improve upon its existing filters that use diatomaceous earth (DE) and cellulose pads.

"We needed assistance in the filtering of young red wines," says Brad Alderson, Woodbridge vice president and general manager. "We were having trouble filtering these wines with traditional methods and were not getting consistent filtration or clarity."

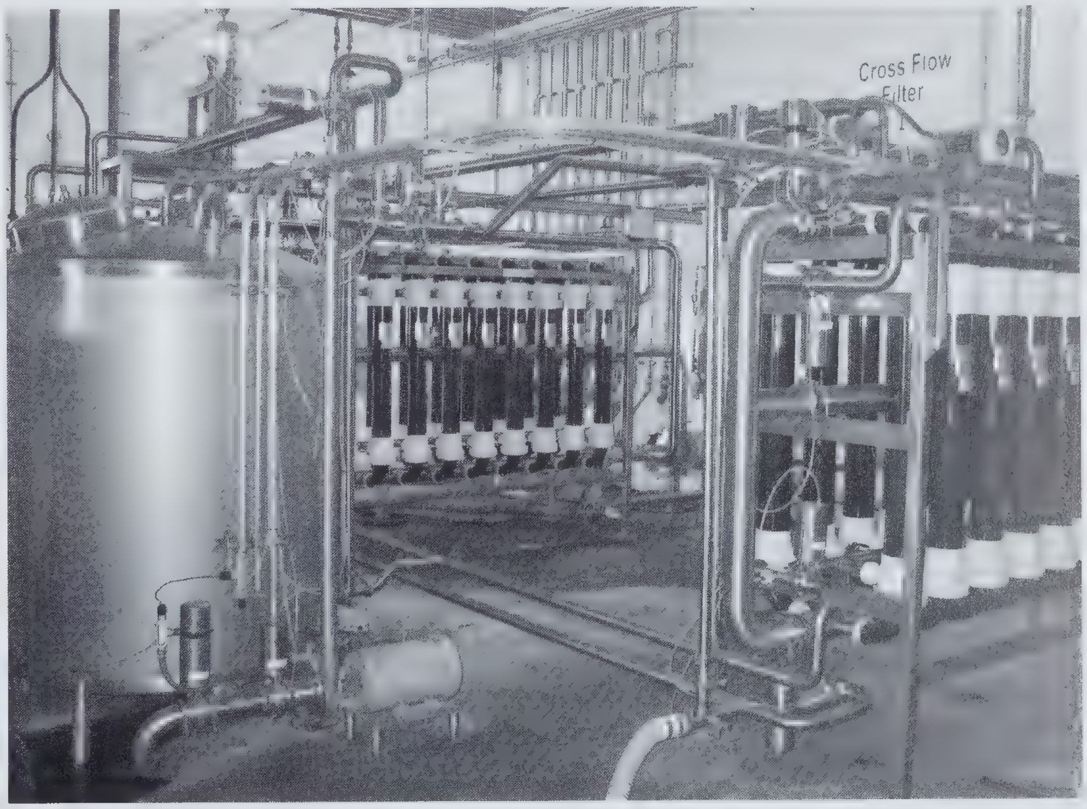
Although conventional filters at Woodbridge were producing wine at a reasonable rate, there were several drawbacks. The DE and cellulose pad filters required high labor and material costs to keep the systems running. Additionally, the pad filters had to be replaced after each run, and in most instances, wines had to be filtered more than once to meet quality standards.

"Depending on the wine, the DE filter could need repacking every four hours," says Drew Scott, senior industrial engineer and project manager for the crossflow microfiltration installation at Woodbridge Winery.

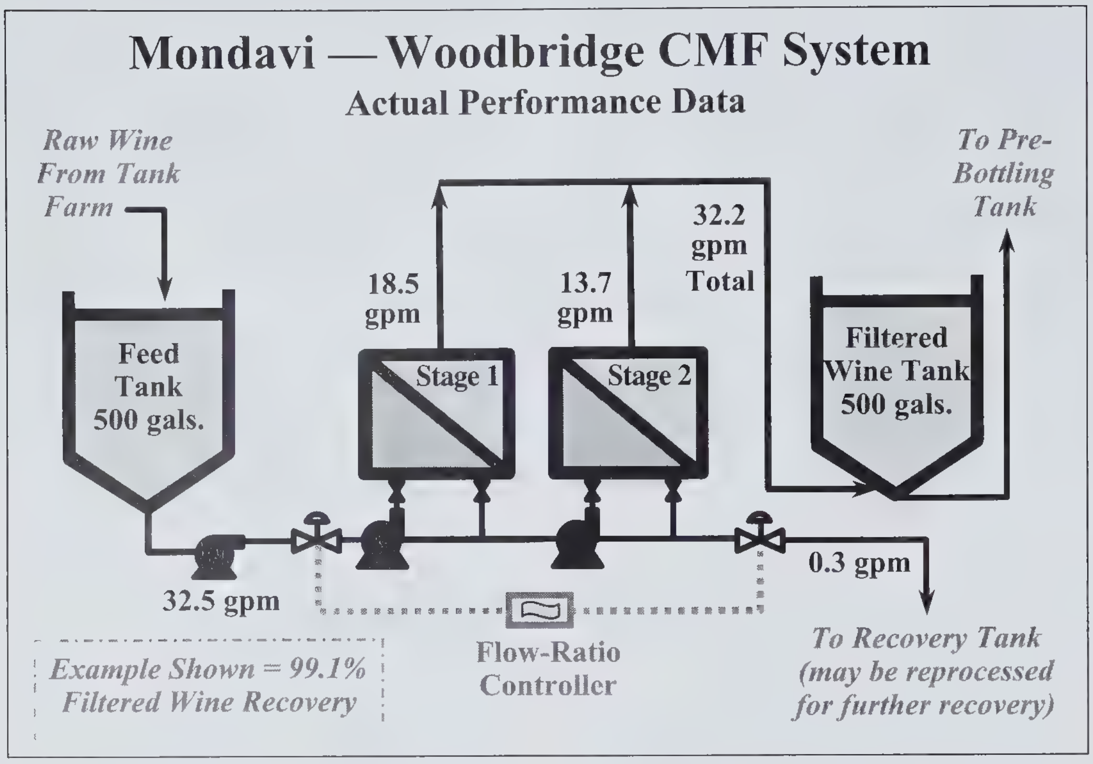
Repacking the DE system increases costs due to the extra material, and additional labor. Excessive DE filtration also stripped the red wines of flavor and color. Additionally, it is challenging and costly to provide adequate storage space for the raw DE and dispose of spent DE.

Woodbridge Winery decided to look for a new system using crossflow microfiltration technology with a 1,500 gallons per hour (25 gallons per minute) capacity of red wine to meet their bottling demands and supplement DE filtration. Several different systems and filtration methods have been tested.

Crossflow microfiltration differs from traditional DE and pad filtration in that the unfiltered wine flows parallel to the filtration media (membrane) rather than directly into the media. A small pressure differential between the unfiltered wine side of the membrane and the filtrate side forces clean wine through the membrane pores. Particulates larger than the membrane pores remain suspended and are kept in cir-



After wine enters stage-1 (in background), approximately 2/3 of the filtered wine exits to a permeate tank (in foreground). The pump beside the permeate tank delivers wine to the bottling tank. The remaining 1/3 from stage-1 is composed of the higher concentration of suspended solids and moves onto stage-3 (foreground). Filtered wine permeates out of stage-3 and goes into the same permeate tank. A small percentage (1% to 2% of the feed, depending on preset recovery rate) bleeds out of stage-3 via the hose seen coming off the front of stage-3, and goes into a portable tank for removal. This is a highly concentrated solution. Currently, new methods are being developed to further process it. If you look closely at stage-3, you can see the membrane circulation ports at the top and bottom (where the unfiltered wine comes in) and the permeate ports in the middle (where filtered wine exits).



Flow chart shows that raw wine enters the system at stage 1, and lees from stage 1 enters stage 2 where it is further concentrated and sent to the recovery tank. High quality wine, or permeate, from stage 1 and 2 are combined in the filtered wine tank.

culation by pumping and physical actions such as backflushing and/or recycle reverse flow.

At the end of a filtration run, the membrane is cleaned, or regenerated, for use again. In contrast, all traditional means of filtration use a barrier (pad or DE cake) onto which the filtered particulates deposit. In time, this barrier becomes either plugged or so thick with particulate deposits that the cycle is stopped and the media discarded. New media is applied before filtration can resume.

To find the most effective solution, Woodbridge Winery reviewed crossflow microfiltration equipment from companies worldwide, testing several different methods including ceramic and polymeric filters of different designs.

Ceramic filters were first considered, however the high cost was prohibitive.

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Woodbridge Winery also evaluated a modified batch design, where the raw wine is filtered from a large tank, separating the good wine from the lees, with the lees remaining in a relatively large feed tank at the end of the filtration process. Unfortunately, this design required more space and a higher investment in process tanks, and had limited potential for cost-effective expansion. After further investigation, an automated crossflow microfiltration system from Koch Membrane Systems (KMS), of Wilmington, MA, was chosen.

Unlike filters from other companies evaluated, KMS offered a membrane system that would allow the winery to maintain a continuous production cycle with relatively stable filtration rates throughout the run. With the KMS design, the concentration of feed solids entering the system remains constant, since concentrated retained particles exit the system on a continuous basis and do not remain in circulation. (See photo page 65)

KMS presented its technology to Woodbridge Winery with an offer to design a membrane to efficiently and cost-effectively produce high quality wine that met the specifications for color retention, bottling membrane filterability, instantaneous filtration rate, and length of filtration runs before cleaning.

"KMS said that they would make the system work and they did," reports Alderson. "We also had confidence in that they were the primary manufacturer of the membrane cartridges and the system. Most other companies purchase some part of their system from other suppliers, using 'off the shelf' membranes rather then membranes designed specifically for wine. After purchase and installation, we spent one year working together to perfect the system."

KMS delivered 36 surface-treated polymer membrane cartridges (with asymmetric pore design and cone-shaped pores), 18 in each of two stages in the 2,400 sq. ft. surface area wine filtration system. The design is a continu-

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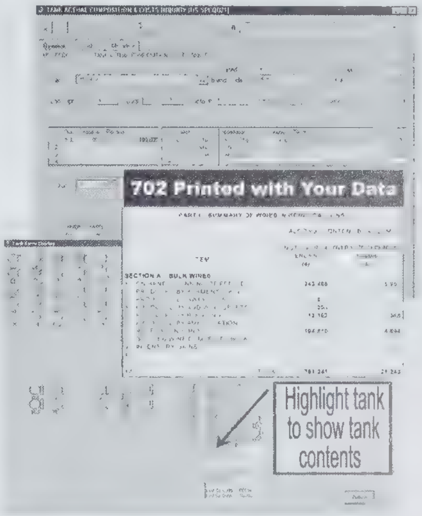
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Crossflow Filtration Report

October, 2005

691,036 gallons 2004 red wine*
Concentrate produced = 6,910 gal (1%)
Loss = 2,855 gal (0.4%)
NET yield = 681,271 gal (98.6%)
Total run-hours (including cleanup) = 504
Average gallons per minute = 23

Concentrate was blended into another wine.

Average attended time was three hours per 24-hour cycle.

* red wine that had not been filtered or centrifuged

ous feed-and-bleed system that can produce 25 gpm for periods up to 100 hours, setting it apart from the modified batch design offered by competitors.

In the new KMS crossflow microfiltration system, unfiltered wine is delivered from large storage tanks to a 500-gallon feed tank that is attached to a system of pumps and filters. When wine enters the first stage, it passes across the membranes, where a portion of clean wine exits to a holding tank while the remaining unfiltered wine with a higher concentration of solid material is passed on for further filtration in the final stage.

More filtered wine exits the membranes in the final stage and is combined with the filtered wine from the first stage in the common holding tank and pumped forward to bottling tanks. High solids lees exit the system separately but continuously and are collected in a small concentrate tank for further processing. This continuous design converts more than 98% of the feed to filtered wine with less than 2% of high solids lees left to exit the system on a continuous basis for further processing by blending or filtration. The system is designed for easy expansion to 3,000 gallons per hour (50 gpm) by adding one more 18-cartridge stage.

RESULTS:

Improved efficiency while increasing quality

Since the crossflow microfiltration system began operation in July 2005, Woodbridge Winery has been better able to retain the quality of its red wines through the filtration process. This has improved both yield and quality of the wine in the bottle. It has reduced dilution and stripping of flavor, which is a greater risk when performing multiple filtration processes using DE and pad filtration.

"With the traditional filtration, to produce 200,000 gallons of wine would take approximately 220 hours; 70 hours for centrifuging, 80 more hours for rough and polish DE filtering, and another 70 hours to process through

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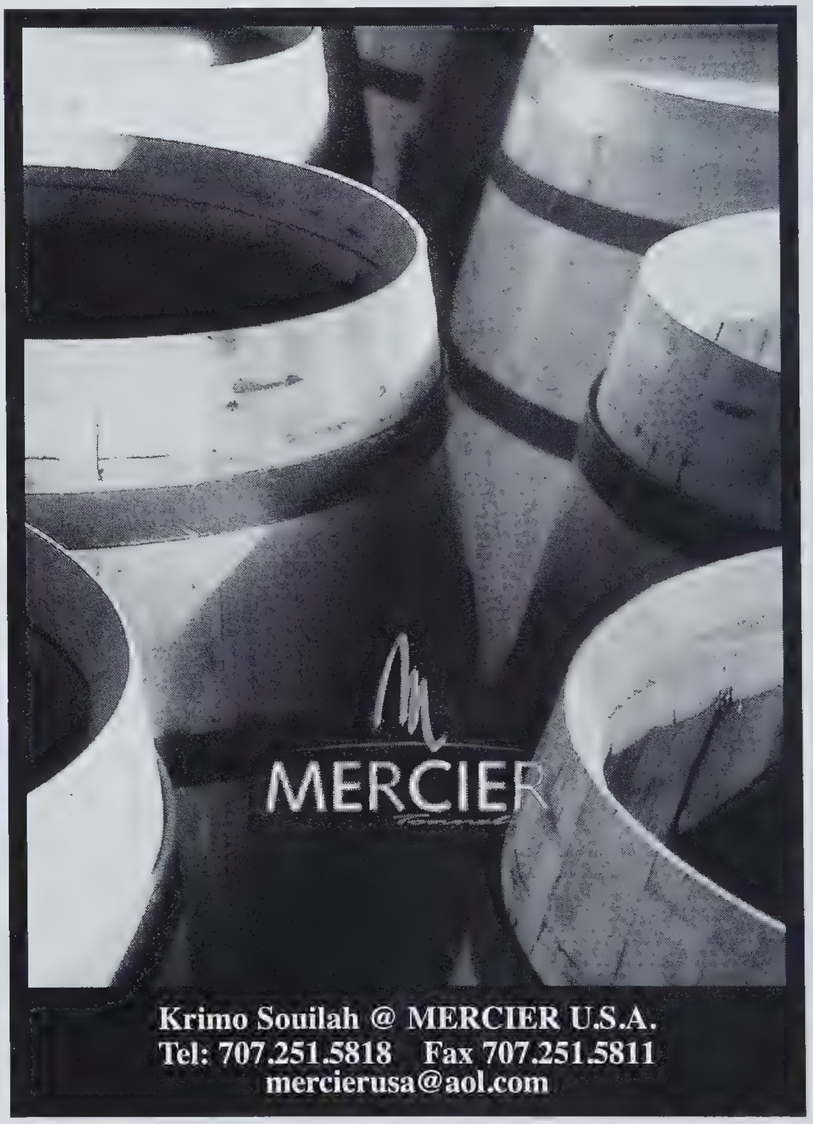

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pad filtration," reports Alderson. "With the new KMS membranes, the same wine can be filtered in 200 hours with a combination of centrifuging high solids lees and crossflow filtration. It is saving us more time because it is being run continuously and with much less labor."

"The biggest benefit we've seen with the crossflow membranes is that we are handling the wine less," adds Scott. "Filtration is now a continuous and simpler process. We've eliminated at least one step, and up to three steps for some wines if the run is smooth. It is easier to maintain wine quality because we do not need to handle the red wines as much as we did with diatomaceous earth and cellulose pad filters."

The new system does not need a backflush cycle to clean the membranes. There are four automatic flow-reversing valves on each unit. Cleaning and preparation time is reduced to about five hours per cycle. Cleanings are performed usually once a week or after a production run.

The reason why the new KMS membrane system does not require a backflush step during production or cleaning is due to a "reverse flow/ recycle" process. Valves stop net production of filtrate for a short time, during which the flow direction is reversed from bottom feed to the cartridges to top feed of the cartridges, for example, and then flow returns to bottom feed and filtrate production resumes. This process requires only a couple of minutes per hour, and is used to remove the dynamic gel layer only (there is little or no pore plugging), and is completely wine-dependent.

Advantages include no pressure changes to harm the membrane and shorten life, no need for additional pumps and programming complexity, and no reuse of filtered wine that translates into shorter production time.

As a result of the successful installation, Woodbridge is considering an expansion of the KMS crossflow microfiltration system to double its current capacity. ■

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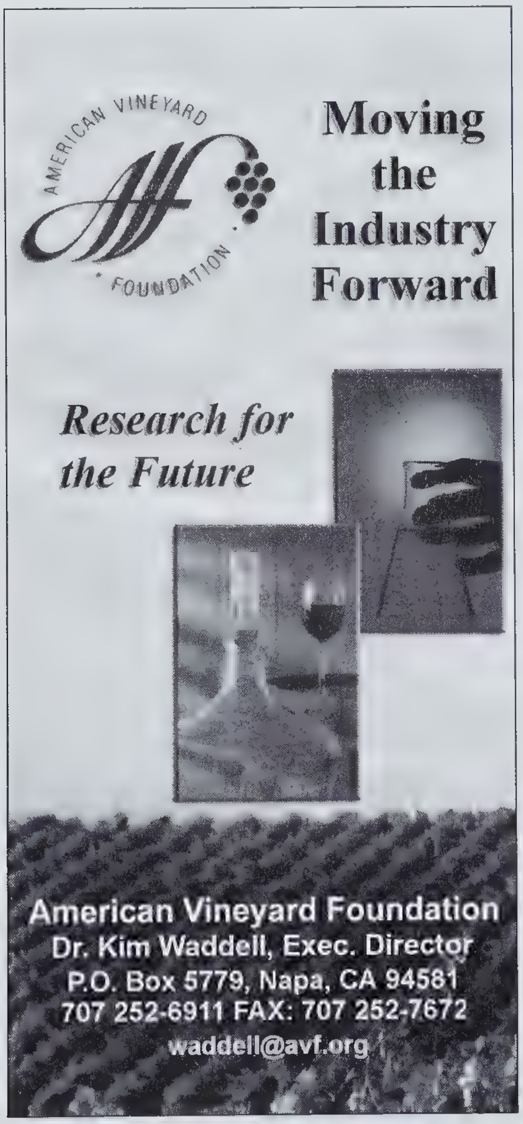
AVF and UC streamline research grant process

BY Ken Freeze

The American Vineyard Foundation (AVF) and the University of California (UC) have joined forces to create a joint Web-based application and review process for research in Viticulture and Enology. Researchers applying to the AVF, Viticulture Consortium West (VCW), or the California Competitive Grants Program for Research in Viticulture and Enology (CCGPRVE) will be able to use this process to apply for funds from all three funding sources.



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The Web-based Request for Proposal (RFP) process not only creates a paperless system but streamlines the process for researchers seeking research funding and for experts reviewing the proposals. It will also provide research project information and executive summaries online so that industry can quickly get access to the research results.

"Our goal is to make it easier for researchers to submit their proposals and for the reviewers to evaluate the proposed research and identify promising new research projects for the industry." says Dr. Kim Waddell, AVF executive director. "We recognize that both the researchers and reviewers are busy people and anything we can do to make this process easier will benefit everyone involved.

"Reviewers volunteer their time when they evaluate these proposals and we really value their contribution. In turn, getting constructive reviewers' comments back to researchers is part of an important feedback loop that will strengthen future proposal submissions from the research community. Furthermore, a streamlined proposal submission process should also encourage more researchers to submit quality proposals to these programs."

"Key to realizing the new system is the resources that the University of California has agreed to dedicate to setting up and maintaining the network," says Dr. Deborah Golino, director of the UC's Viticulture Consortium. "We are working closely with some talented UC programmers with a lot of experience in Web-based grant programs. Kim and I are customizing the process so it can best fit the needs of the grape and wine industry these programs serve. We are optimistic that this project will improve communication among everyone involved, making information available to the industry in much more timely manner."

It's expected that the new system will be up and running in time for the 2006–2007 funding cycle.

Established in 1978 to raise funds for research in viticulture and enology, the AVF is a wine-industry sponsored non-profit organization funded by growers and vintners. Since its founding, the AVF has funded over $16 million in wine and grape related research. For a complete listing of the funded research projects or more information regarding the AVF, go to their website: www.avf.org/. You can also contact Dr. Kim Waddell at 707/252-6911 or by e-mail at info@avf.org.

The Viticulture Consortium West (VCW) has been in operation since1996 with the objective to establish and coordinate a research program in support of viticulture and the viticulture industry with a peer review grant program through which Experiment Stations and Universities in the western states, Texas, and Oklahoma can be assisted in developing and maintaining competitive viticulture industries. Administrated through the University of California, Division of Agricultural and Natural Resources (DANR), the program is part of the national Viticulture Consortium which includes a partner program, Viticulture Consortium East, administrated by Cornell University, New York.

The Viticulture Consortium is funded by the United States Department of Agriculture Cooperative State Research, Education, and Extension Service (CSREES) to supplement and encourage the viticulture industry to continue to provide industry funding for research and extension education.

The California Competitive Grant Program for Research in Viticulture and Enology (CCGPVE) was created in 1997 by a special allocation from the California Legislature contingent upon matching funding from industry. CCGPVE is open to all California Public Institutions with research capabilities to address the needs of the California Viticulture and Enology Industry. Dr. Deborah Golino is director of both programs and can be contacted at 530/752-3590 or by e-mail at dagolino@ucdavis.edu. ■

SB 118

A simple and coherent model for direct-to-consumer winery sales

BY Paul Kronenberg, President
Family Winemakers of California

Thank you for the opportunity (December 8, 2005) to speak on the implementation of SB 118. Family Winemakers of California is a statewide trade association of wineries and vineyards. We represent over 600 wine producers, mostly small operations that have a tremendous stake in gaining larger market access. Holding this hearing at Trentadue Winery (Geyserville, CA) which will benefit from direct shipping reform, is appropriate. Family Winemakers, a sponsor of SB 118, played a significant role in pushing the litigation on direct shipping by wineries that led to SB 118l.

In her comments today, Tracy Genesen, the Coalition for Free Trade's legal director, mentioned several amicus briefs that guided the Supreme Court in making its decision. I wanted to mention one in particular that appears to have helped Justice Kennedy in his majority opinion. It was the amicus brief on the legislative and legal history of the 21st Amendment that was submitted by several California regional winery associations, including Sonoma, Napa, Monterey, El Dorado, Temecula, and Santa Cruz Mountains.

Since the Supreme Court decision (May, 2005) in *Granholm v. Heald*, we've been very encouraged by develop-

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Editor's Note: These comments were presented by Paul Kronenberg to the California Legislature Senate Select Committee on California's wine industry, Senator Wesley Chesbro, Chair. The Committee reviewed the Supreme Court's May 16, 2005 decision in *Granholm v. Heald*, regarding discriminatory wine marketing practices and the subsequent actions by legislatures in the U.S. to comply with the decision's requirements.

Starting January 1, 2006, any licensed winery in the U.S. will be able to apply for a permit to ship to California adult residents. SB 118 brings California into compliance with the Supreme Court decision. SB 118 represents the next step suggested in Justice Kennedy's majority opinion, that reciprocity laws for wine producers are barriers to interstate commerce.

SB 118 allows licensed out-of-state winegrowers to apply for a direct shipping permit from the California Department of Alcoholic Beverage Control for $10 annually. They are also required to register with the State Board of Equalization in order to appropriately collect and remit sales and excise taxes. Wines shipped to adult California consumers must be labeled according to requirements and a signature must be collected by the common carriers.

For more information on SB 118, go to: www.senate.ca.gov, click on "legislation," enter SB118 in the dialogue box.

Table I. Regulatory Comparison of Permit and Reciprocal States

State	Type	Fee	Qty. Limit	Data Collection	Taxes	Local Taxes	Brand Registration
AK	N/A	N/A	None	No	No	No	No
CA	P	$10	None	No	Yes	No	No
CO	R	$50	2c/m	No	No	No	No
CT	P	$250	5c/bm	Yes	Yes	No	Yes
DC	N/A	N/A	1bt/m	No	No	No	No
GA	P	$50	5c/y	No	Yes	No	No
HI	R	$0	3c/y	Yes	No	No	No
IA	R	$0	2c/m	No	No	No	No
ID	R	$0	2c/m	No	No	No	No
IL	R	$0	2c/y	No	No	No	No
LA	P	$150	4c/y	Yes	Yes	No	No
MI	P	$100	1500c/w/y	Yes	Yes	No	No
MN	R	$0	2c/y	No	No	No	No
MO	R	$0	2c/y	No	No	No	No
NB	P	$500	1c/m	No	Yes	Yes	No
NC	P	$100	2c/m	No	Yes	No	Yes
ND	R	$0	3c/m	No	No	No	No
NH	P	$0*	5c/y	Yes	Yes	No	No
NM	R	$0	2c/m	No	No	No	No
NV	P	$0	12c/y	Yes	Yes	No	Yes
NY	P	$125	36c/y	No	Yes	Yes	No
OH	N/A	N/A	None	No	No	No	No
OR	R	$0	2c/m	No	No	No	No
PA	N/A	N/A	None	No	No	No	No
SC	P	$600	2c/m	Yes	Yes	Yes	Yes
TX	P	$75	3g/m	Yes	Yes	No	No
VA	P	$65	2c/m	Yes	Yes	No	Yes
WA	R	$0	2c/y	No	No	No	No
WI	R	$10	3c/y	No	No	No	No
WV	R	$0	2c/m	No	No	No	No
WY	P	$50	2c/y	Yes	Yes	No	No

*New Hampshire's fee is $228, but was waived due to lack of applicants.

ments in many states that were formerly closed to any direct-to-consumer sales by out-of-state wineries. New York, Michigan, Texas, Connecticut, Ohio, and Pennsylvania are open to one degree or another. Ohio and Pennsylvania are open (under court order) and, no doubt, will address permanent solutions during current or upcoming legislative sessions.

Massachusetts and Florida are in limbo. Each has a court decision invalidating their shipping bans. The Massachusetts Legislature recently passed a permit bill, but the Governor vetoed it since it restricted the permit to only producers of less than 50,000 gallons. There is an expectation of a veto-override and where that will lead is open to conjecture. Florida, no doubt, will wrangle over a permanent solution during its 2006 legislative session.

My comments are directed at emerging trends across the U.S. in regulating direct-to-consumer winery sales. Trends that reflect, no doubt, the political climate and culture within each state, but also are not truly reflective of promoting consumer choice. The backdrop for these comments is SB 118, which we believe is a simple and coherent approach to encouraging direct shipping by wineries.

Each state that has statutes on the books or has recently enacted legislation to correct discriminatory shipping bans generally used the wine industry's direct shipping permit bill model as a starting point. The end product often winds up with some unique wrinkles. These wrinkles, in some cases, create new barriers to market entry for out-of-state wineries.

The trends are significant variations in the cost of shipping permits or licenses, and significant differences in other regulatory requirements that range from data reporting to brand registration requirements to tax collection differences.

The impact on out-of-state wineries seeking to do business in one of these new states varies. It is important for perspective, at this point, to note that direct shipping litigation was pursued by small producers that couldn't gain access to markets and consumers. Current figures from the U.S. Tax and Trade Bureau report that there are over 4,000 wineries in the U.S. and more than 3,000 are small producers. The burden of managing multiple regulatory and tax scenarios has acted as a deterrent to market entry.

SB 118 was intended to be not only a response to the Supreme Court's decision, which implicated reciprocal statutes for direct-to-consumer winery sales, but also to set a standard for shipping permit statutes. It harmonizes the state's need for regulatory certainty and business's need for ease and simplicity, which creates an eco-

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nomic environment to promote interstate commerce and improve consumer choice.

SB 118 incorporates a low fee with a simple and quick application process, simplifies the tax requirements for out-of-state wineries with one statewide rate, and preserves the Department of Alcoholic Beverage Control's authority to enforce the statute without creating new administrative burdens. It also sets no limits on producer participation or on what consumers may wish to order.

Table I is a table of current permit and reciprocal states that demonstrates some of the differences that have emerged. It is not meant to be an exhaustive list and thus doesn't cover such issues as differences in shipping container labeling, differences in type of data collected, record keeping rules, and the frequency with which the data must be reported. The information has been culled from statutes and regulatory postings, and represents our current interpretation of requirements.

While there is a reasonable expectation that regulations across 31 states, and more in the future hopefully, will result

Continued on page 122

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SMART VITICULTURE

Terroir reconsidered

BY Dr. Richard Smart

Over the last few years, I have been increasingly exposed to the new technology of remote sensing for vineyards. My first personal experience was about 25 years ago (before most present-day researchers), when Dr. Doug King and I used aerial infrared photography to monitor the spread of phylloxera in Gisborne, New Zealand. There were no digital images then, no calculations of vigor index. Still, we were able to spot phylloxera infestations from the air, including those which were very recent, more so than we could on the ground.

Irrespective of the level of technology, I quickly appreciated the benefits of a "bird's eye view" in identifying vineyard problems. Today, I often ask clients for normal color aerial photos if infrared images are unavailable. Both can be very helpful in diagnosing problems, and in guiding vineyard management.

What is the value of an infrared photograph?

An infrared photograph is as useful to a viticulturist as an X-ray is to a physician. Mind you, there is a skill in interpreting these images, and I have seen several instances where vineyard managers have images on their wall depicting problems in their vineyards but have not changed management practices. One can clearly see variation, and an experienced observer can distinguish between stress due to water and nutrient shortages, poor drainage, disease, or various soil conditions.

What has all of this to do with "terroir"? The concept of terroir is somewhat vague as there is no exact English translation, but it is a recognition that wine quality can vary over small distances, within and between vineyards. It is a recognition that "place" can affect wine quality.

There have been many studies of causes for variation in wine quality between and within vineyards. One of the finest terroir studies I know of was in the 1960s and 1970s by Professor Gerard Seguin, of the University of Bordeaux. He studied vineyards around Bordeaux, comparing those of eminent reputation with those of lesser reputation, according to the well-known 1850 crus classification.

Seguin found soils varied between properties, but that there was little correlation between soil chemistry and wine reputation. Soil factors that did correlate with quality were those affecting soil moisture availability, such as texture, root depth, and drainage. Premier cru vineyards were well drained, yet buffered against severe moisture stress by moderately deep soils.

In 1980, I made microclimate measurements with Dr. Alain Carbonneau in some Bordeaux vineyards, and we found that the more famous vineyards had more open canopies because of few and smaller leaves. Such vines were of low vigor, the sunlight was able to better penetrate, and leaves and clusters were better exposed. In other words, because of low vigor, they had better canopy microclimate.

According to Seguin (and many studies in other regions), it is the natural variation in soil properties affecting plant water availability that is the prime reason for variation in grape composition and wine quality within and between vineyards.

More recently, studies in Bordeaux by Kees van Leeuwen and others (*American Journal of Enology & Viticulture, 2004, Vol. 55, pp 207–217*) have given the same results. They studied three varieties (Cabernet Sauvignon, Cabernet Franc, and Merlot), on three soils of different water-holding capacity, over four years of differing weather. In summary, the most important factor affecting wine quality was the presence of water deficit before veraison, which stopped early shoot growth. Grapes in this environment ripen more quickly and have higher sugar and anthocyanins.

Terroir, wine quality, and aerial infrared images

Recent studies in Western Australia by Rob Bramley and others, published in 2003 (*Australian New Zealand Grapegrower & Winemaker, no 473a, pp 84–87*), described how the Vasse Felix winery in Margaret River used precision viticulture methods on a block of Cabernet Sauvignon to improve quality. The block was photographed using digital multispectral cameras in February 2002 and analyzed for plant cell density using the ratio of infrared to red. Plant cell density is a measure of vine vigor.

The areas of low density showed riper fruit with lower TA and similar pH. Subsequently, a decision was made to differentially harvest the block, with fruit from two sectors of the

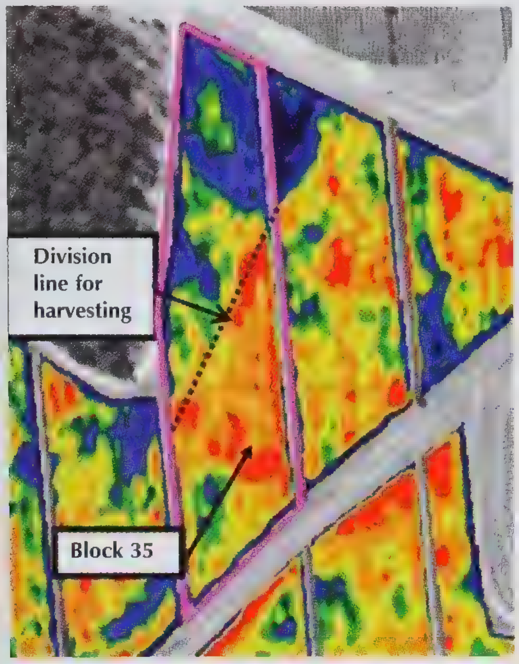

Figure I. Aerial NDVI image of block 35 Pinot Noir at Tamar Ridge. North is at the top of picture. Dark blue are lowest vigour vines, grading through blue, green, yellow, orange to red repesenting high vigour. The line shows the differentiation between high and low vigour vines for the commercial study. The microvinification study was carried out on vines in each vigour (color) class in the northern part of the vineyard.

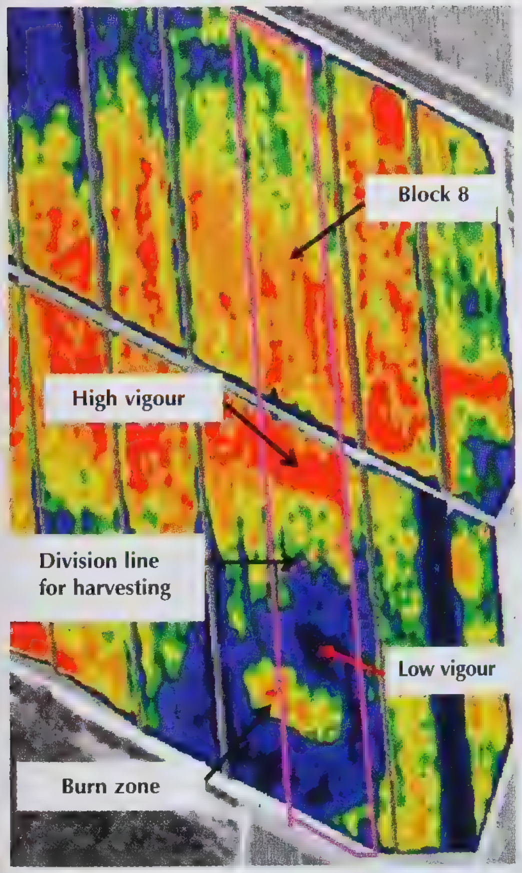

Figure III. The aerial infrared images of Block 8 Sauvignon Blanc at Tamar Ridge, north at the top. The photo shows the zone where trees were burnt in the low vigour zone.

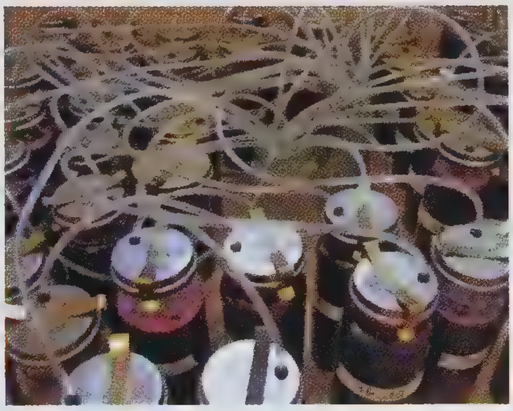

Figure II. Experimental vinifications of replicated single vines in different vigor classes. Jars contain wine finishing fermentation after pressing, with tubes to an air trap. Tamar Ridge 2005 vintage.

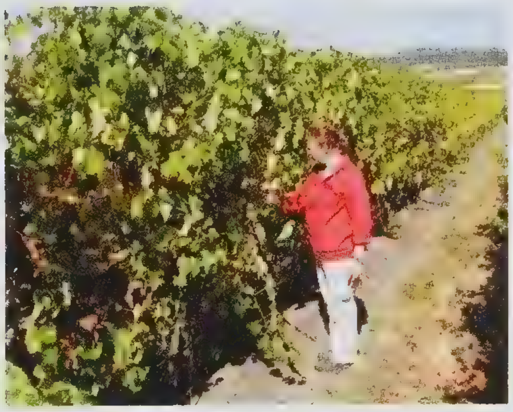

Figure IV. High vigor Sauvignon Blanc vines in Block 8, showing darker green, healthy leaves and longer shoots. Note the pale colored vines with low vigor further down the row.

block put into two separate bins and vinified separately.

There was no surprise that these two wines were different. The low-vigor area had lower yield (1.5 tons/acre) than the high-vigor area (6.4 tons/acre). Wine from the low-vigor vines had higher sugar and lower acid with similar pH. Wine from the low-vigor area was judged better quality and graded into a $30 retail bottle compared to the wine from the higher-vigor zone, graded into a $19 bottle product. Presumably, had the block been harvested into a single lot, it would all-have been graded lower.

This example shows several things. First, variation in vine vigor can be measured by remote sensing. Second, this variation in vigor can be described down to individual rows (and vines). Third, that variation in vigor translates to yield, fruit composition, and wine quality differences.

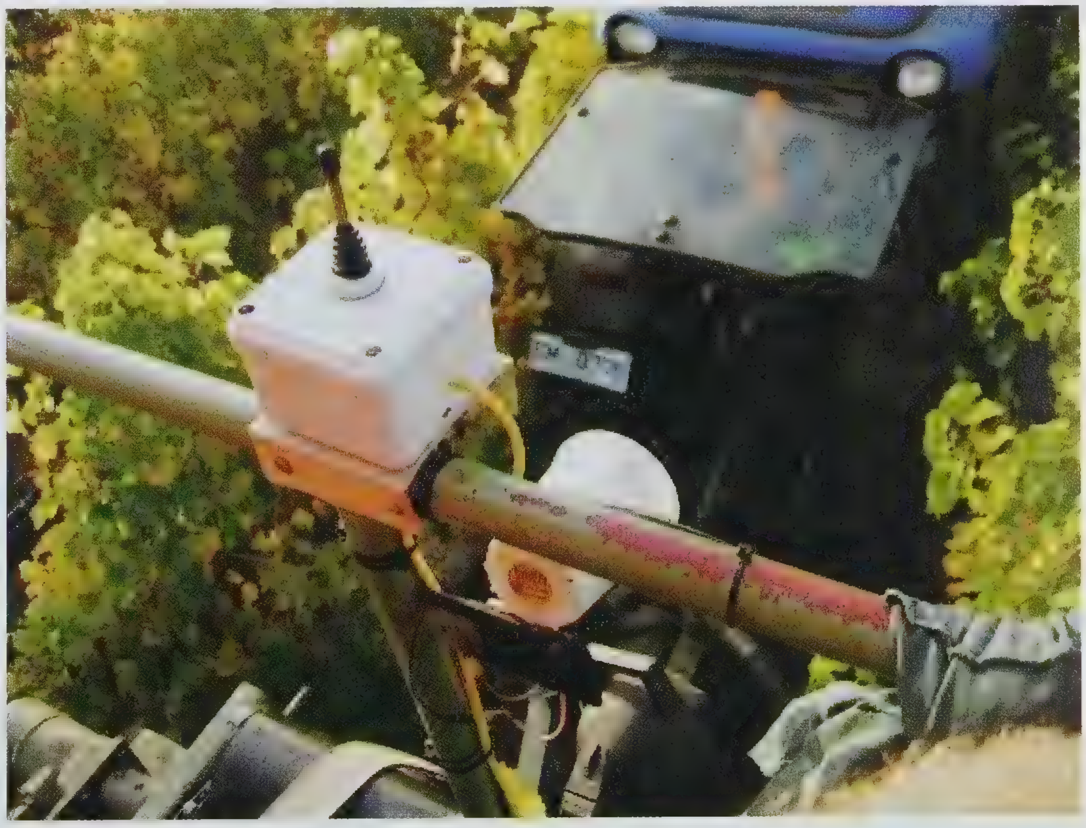

Figure V. Differential harvesting using separate bins for fruit from vines of different vigor in Sauvignon Blanc. A siren on harvester is sounded to indicate a change of bins.

2005 studies at Tamar Ridge, Tasmania

Tamar Ridge is a leading producer of cool climate wines in Tasmania, Australia, with climate similar to northern Oregon. The company is my major client, and we are using world's-best technology to improve wine quality. Aerial digital infrared photographs were taken during veraison in February 2005 and these were used for harvest scheduling.

There are two Tamar Ridge brands: "Devils Corner" at a lower price point, and the higher price point "Tamar Ridge." It helps harvest planning to assign the vineyards to their brands pre-harvest, as different vinification methods may be used.

Enologist Mike Foggarty, vineyard manager Paul Townsend, and I reviewed each vineyard. Mike had some ideas about previous performance of various blocks, and we had yield estimates. All of this information was distilled into a vineyard classification.

For many of the vineyards, we were able to explain vigor variation with our existing knowledge. Poor drainage, nutrient stress, and shallow soils/ water stress were the common causes.

For some blocks, we realized we could reduce heterogeneity by management, for example, by adding drainage or differential fertilizing. However, these changes could not be introduced before harvest, so we had to accept the blocks as they were.

Other blocks offered the possibility of differential harvesting, where there were large and quite discrete zones of different vigor. Harvest of essentially two different crops was quite simple, using two tractors with bins that could be switched from one to the other as the zone changed.

Two vineyards offered this possibility, one of Pinot Noir, the other Sauvignon Blanc. The Pinot Noir block had a reputation for not producing wines up to its quality potential. Mike described the wine characters as "sweet and sour," a combination of ripe and unripe characters. In this block, Clone MV6 was planted on its own roots in 1999. The vines were cane-pruned and trained to a Scott Henry trellis.

The infrared image in Figure I shows red for high vigor, grading through the rainbow to dark blue as low vigor. The top of the picture shows a large, low-vigor zone, with higher vigor vines to the south. We machine-harvested this block differentially (see Figure I).

Typically, machine harvesting at Tamar Ridge uses three drivers and tractors (two with bins, and one pulling a tow-along harvester) and costs around $400 per hour or about $100 per ton. Differential harvesting (separating grapes from high- and low-vigor vines during harvest) required one extra tractor and bin and cost around $17 per ton extra, or less than 20% above normal costs. For this small cost, the fruit could be harvested into two lots for delivery to the winery and separately fermented.

Vine health compromises wine quality

The impact of this on wine quality was assessed in two ways. First, the commercial ferments were assessed in August, at the annual post-vintage tasting with wine consultant Nick Bulleid MW. Wines were quantitatively judged for appropriateness for Tamar Ridge or Devils Corner styles.

Second, I performed microvinifications, using four single-vine replicates of each of five vigor classes.

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Vines were hand-harvested, fruit was weighed, and vines were assessed for leaf health. Fruit quantities ranged from 2 to 8 lbs, and ferments were carried out under standard conditions in plastic buckets and finished in glass preserve jars. Figure II shows the wines completing fermentation under CO_2 gas cover. Each is connected to an air trap. These will be chemically analyzed at the Australian Wine Research Institute.

I had anticipated that the high-vigor wines would have shown the lowest winemaking potential, due to denser canopies and higher yields, but this seems not to be the case. Yields were higher for the high-vigor vines, but only by about 10% over the lowest vigor. Pruning weights, however, were nearly 250% higher for high-vigor vines. Similarly, and again surprisingly, there were no consistent effects of vigor on fruit composition, although berry size was smaller for low-vigor vines by 20%.

The big difference between high and low vigor was in canopy health, with low-vigor vines showing 60% yellow leaves and 20% defoliation, compared to 25% yellow and no defoliation for high-vigor vines. Lower-vigor vines had a reduced capacity to ripen fruit, even though yields were smaller.

The tasting panel found little difference between high-vigor and low-vigor wine lots, made in the commercial winery. Both lots were relatively low scoring. I believe that the low-vigor vines did not deliver the expected wine-quality benefit because of poor leaf health during ripening, due to excessive prior water stress. The results do suggest that there is more to Pinot Noir quality than just yield!

Sauvignon Blanc quality improves

Our second experience was with Sauvignon Blanc. This block of mixed clones was planted in 1995 and is trained to Scott Henry. The infrared image (Figure III) shows this block, which extends both sides of the central alley way, with north to the top. In the image, a significant proportion of the southern side of the block shows low-vigor vines and appears to be suffering from nitrogen stress and prior water stress. Nutrient stress is further suggested by the cigar-shaped zone of high vigor in the center of the low-vigor vines,where trees were previously piled and burned.

Figure IV shows the higher-vigor appearance of vines on the deeper soil to the north. Leaves are greener and shoots are longer, yet fruit is well-exposed on the Scott Henry trellis. Fruit on these vines showed typical Sauvignon Blanc taste characteristics near harvest despite good yields (4 tons/acre), yet the fruit on low-vigor and lower yielding vines (2.4 tons/ acre) had no such typicity.

Needless to say, even though there were no significant fruit composition differences between high and low vigor, the wines were better from higher-vigor vines. They were allotted to the Tamar Ridge brand (and have since gone on to win gold medals at wine shows), while the wine from low-vigor vines went to "Devils Corner," providing yet another example where high yields produced the **better** quality wines!

Conclusions

Undoubtedly, this vineyard "micro-management" or "zonal viticulture" (call it what you will) is the way of the future and offers vineyard managers even more opportunities to make bet-

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ter wine in the vineyard. For cool climate producers, there is an obvious need to pay more attention to leaf health and vine balance and less to crop regulation. ■

Dear Dr. Smart:

I read with interest your recent column "Primer on growing quality wine grapes" in the September/October-2005 *Practical Winery & Vineyard*. You have covered the most important steps for establishing and growing wine grapes, but in my opinion, you left out one important factor a grower should consider: disease testing.

Growers are performing all sorts of practices to gain time in production and remain competitive in the market. One activity called "top working" allows growers to graft a new scion variety onto an established vineyard (such as changing the variety but keeping the established rootstock). Very often this activity is done without knowledge of the grapevine disease status of the established vineyard or the new scion grafting material.

I am sure you and growers understand the large initial investment associated with planting grapevines in a new site. In my long career as a grapevine pathologist I've seen vineyards fail due to the presence of viruses that cause rootstock-scion incompatibility and other syndromes.

Typical symptoms normally appear one or two years after planting. *Grapevine leafroll* associated viruses cause slow and steady decline of planted vines. Viruses such as *Grapevine fan leaf* (GFLV), *Arabis mosaic* (ArMV), and other viruses of the *Nepovirus* genera cause rapid decline of vineyards.

Last but not least, growers should get used to testing the soil for the presence of nematodes and soil-born pathogens such as *Agrobacterium vitis*.

I truly enjoy reading your column. Keep up the good work!

Judit Monis, Ph.D.
Plant Health Services Manager
STA Laboratories, Inc.
Gilroy, CA

Thanks Judit,

Thanks for your note, and I stand corrected. I certainly should have mentioned using planting material of best health, and being aware of top-working and viruses.

It is always nice to know that my column is being read.

Cheers,
Richard Smart

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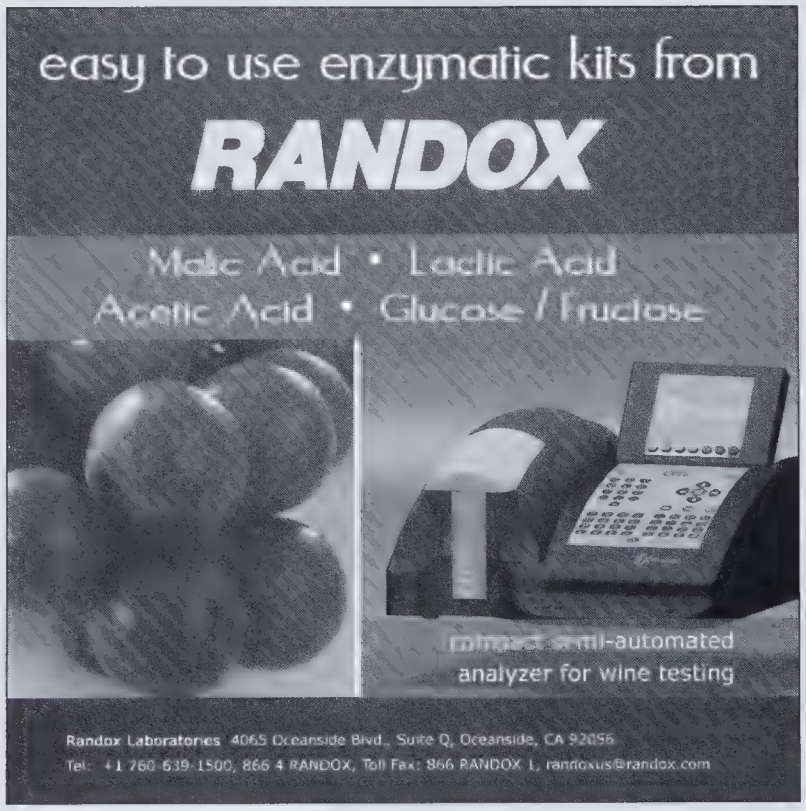
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FEBRUARY 3–5, 2006
COLD CLIMATE WINE & GRAPE CONFERENCE

Second annual conference at the Kahler Grand Hotel in Rochester, MN. Theme of the Minnesota Grape Growers Association's conference is: Northern viticulture — coming of age; The business of growing grapes and making wine in the North. Keynote presentations include: Mike White on "Growing the Grape and Wine Industry," and Donniella Winchell on "Working Together to Develop our Industry."

Conference will include vendor displays, a cold climate winemakers forum, and a 11/2 days of parallel tracks on topics of specific interest to cold-climate winemakers and grape growers including: pest management, fertilization, vineyard economics, cold climate cultivars, wine faults, and blending and round-tables for cold climate grape-growers and winemakers. Conference will also include an optional half-day Tax and Trade Bureau update by Perky Ramroth of the TTB. There will be a grape-growers and winemakers networking banquet on Saturday night. For more information to attend or exhibit, visit the MGGA website at www.mngrapes.org/.

MARCH 19–22, 2006
TERROIR 2006

Many of the world leaders in the fields of earth science, and viticulture and enology will gather at the University of California, Davis to focus on Terroir. The five-day conference will be hosted by the Robert Mondavi Institute for Wine & Food Science at UC Davis in collaboration with the UC Davis Geology Department.

SUNDAY, MARCH 19

Alain Carbonneau (Institut des Hautes Etudes de la Vigne et du Vin, Montpellier, France), Jancis Robinson (wine writer and author).

MONDAY, MARCH 20

"What is Terroir," Warren Moran (University of Auckland, New Zealand), Dirk Hampson (Nickel & Nickel Single Vineyard Wines, Napa,CA).

"Terroir Around the World," James Halliday (Coldstream Hill Winery, Australia), Karen MacNeil (Culinary Institute of America, St. Helena, CA) [with wine tasting].

"Geology/Soils/Nutrients," Claudio Gori (Chianti 2000, Florence, Italy), Paul Skinner (Terra Spase, St. Helena, CA).

TUESDAY, MARCH 21

"Climate and Water," Richard Smart (Smart Viticulture, Australia), John Gladstones (Honorary Research Fellow, University of Western Australia).

"Impact of Global Climate Change," Greg Jones (Southern Oregon University).

"Techniques for Studying Terroir," Johnathan Swinchatt (EarthVision, Cheshire, CT), Kees van Leeuwen (Bordeaux Agricultural University, Bordeaux, France).

WEDNESDAY, MARCH 22

"Vine and Grape Physiology," Mark Matthews (University of California, Davis), Andy Reynolds (Brock University, Canada).

"Biodyanamics," John Reganold (Washington State University), and Alan York (Wholistic Estate Managementt, Ukiah, CA).

"Sensory Characteristics of Wine," John Buechsenstein (University of California, Davis), Jean-Xavier Guinard (University of California, Davis).

"Marketing the Romance of Terroir," Maurizio Gily (Viticulture editor of Vignaioli Piemontesi, Piemonte, Italy), Alan Busacca (Washington State University) and Ilze Jones (Seattle, WA).

For program updates, please visit http://terroir2006.ucdavis.edu.

There will be field trips Thursday and Friday to vineyards in Napa and Sonoma valleys and the Sierra foothills. Field trips on Thursday will converge on the Culinary Institute of America in St. Helena for a reception and dinner.

Registration is $500 for industry participants and $350 for academic participants, and a reduced registration for students is available online at http://terroir2006.ucdavis.edu//.

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PROGRAM AND PRESENTERS:

TUESDAY, APRIL 4

"Microbiological critical quality control points," Ken Fugelsang (Fresno State).

"Emerging developments and patterns of microbes in wines," Chair: Dr. Sakkie Pretorius (Australian Wine Research Institute), Lars Petersen (Gusmer Enterprises), Dr. Neil Brown (Vinquiry), Lisa Van de Water (The Vinotec Group).

"What's important — Genotype or the Phenotype?" Chair: Dr. Linda Bisson (UC Davis), Dr. Alice Wright (Fresno State), Dr. Torey Arvik (ETS Laboratories), Dr. Barry Bochner (Biolog).

"What we have now and what's coming down the track," Chair: Ken Fugelsang (Fresno State), Dr. Peter Sommer (Chr. Hansen), Gordon Specht (Lallemand), Dr. Nick Yap (AB Mauri), Dr. Patrice Pellerin (DSM), Dr. Hennie van Vuuren (University of British Columbia).

"It's all a matter of taste — Mannoproteins and lactic acid bacteria" [tasting included], Dr. Alan Bakalinsky (Oregon State University), Dr. Charles Edwards (Washington State University).

Reception immediately followed by optional networking dinner.

WEDNESDAY, APRIL 5

"What is coming over the horizon?" Chair: Dr. Roy Thornton (Fresno State), Dr. David Mills, (UC Davis), Dr. Susan Rodriguez (Fresno State), Dr. Aline Lonvaud-Funel (University Victor Segalen Bordeaux).

"Whatever the continent — It is still all about metabolism," North America: Dr. Linda Bisson (UC Davis), Australia: Dr. Vladimir Jiranek (University of Adelaide), France: Dr. Daniel Granes (ICV).

"Wish list — What we would like to have — The industry speaks!" Moderator: Dr. Christian Butzke, (Purdue University), Barry Bergman (R.H. Phillips Winery), Jeff Brinkman (Husch Vineyards), Mark Beringer (Duckhorn Vineyards), Jeff Cohn (JC Cellars/Rosenblum), Dr. Bill Edinger (Constellation Wines), Dr. Tom Pugh (E&J Gallo Winery), Dr. Nichola Hall (Bronco Winery), Tom Collins (Foster's Wine Estates).

"Where we were, where we are, where we are going," Dr. Sakkie Pretorius (Australian Wine Research Institute).

For Registration Details, go to website: http://cast.csufresno.edu/ve/veevents/Wine%20Micro%202006/Wine%20Micro%202006%20index.htm.

For more information, contact: Cynthia Wood, Information Services Coordinator, Viticulture and Enology Research Center, Dept. of Viticulture & Enology California State University, Fresno, CA, Tel: 559-278-7135 Fax: 559-278-4795.

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CAKEBREAD CELLARS

New technology for planning/tracking vineyard data

BY Tina Vierra

Cakebread Cellars, (Rutherford, CA) continually looks for ways to improve wine quality. "Today's competitive wine market requires better and more consistent wine quality, and more stringent cost controls in both the winery and vineyard," says Bruce Cakebread, winery president. "We have to keep making better wine, and we have to deliver it to the customer at a competitive price."

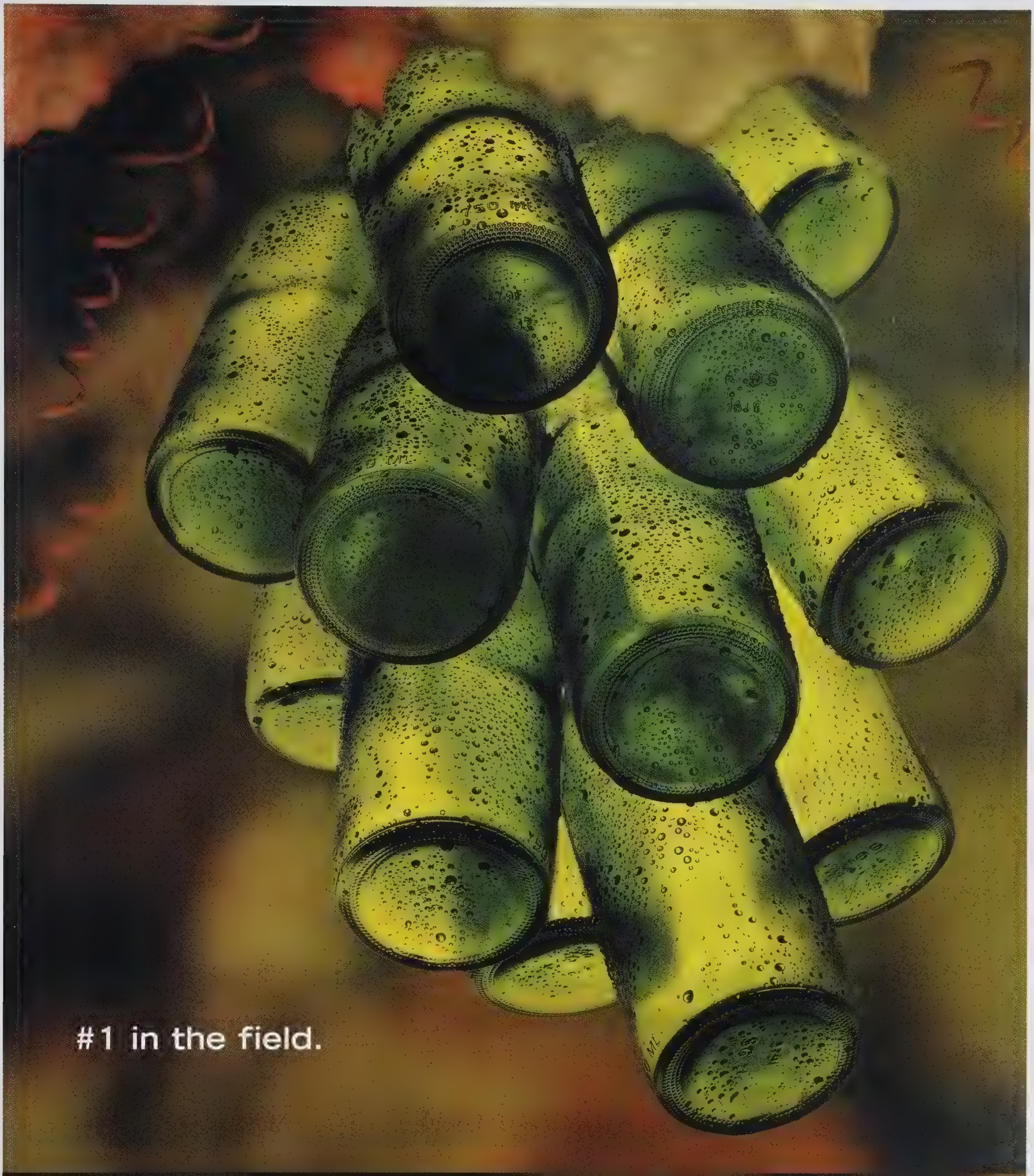
"One of the reasons for the success of Cakebread Cellars is that they have always taken the long view," says Phil Freese, president of Winegrow (Healdsburg, CA) and consultant to Cakebread since 1993. "They consistently dedicate resources to planning: create long-term, cooperative relationships with growers, acquire strategic properties for anticipated growth; and build long-lasting distribution networks."

Founded in 1973, Cakebread Cellars has grown from a 157-case Chardonnay producer in 1974 to farming about 270 acres in Napa Valley and 50 acres in Anderson Valley. Cakebread produces Napa Valley Sauvignon Blanc, Chardonnay, Cabernet Sauvignon and small amounts of Pinot Noir, Merlot and Syrah, plus Chardonnay and Pinot Noir from Anderson Valley.

To manage winemaking tasks and schedule the cellar work force, Cakebread Cellars uses Winemakers Database software. "We like to have very precise information about everything that is going on with each lot of wine," says Cakebread. "It is critical to making the best of each load of grapes that comes into the winery."

But any good winemaker will tell you that "great wines" are made in the vineyard as much as in the winery, so Cakebread Cellars sought to find a software system to help manage the complex information about each vineyard block and monitor its response to different farming techniques.

Cakebread viticulturist Toby Halkovich records cluster weight data into a "Trio" PDA unit, which uploads in real-time to the winery's master database on a remote server. (Photo by John McJunkin)



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Real-time monitoring of vineyard information was a primary reason Cakebread Cellars chose *PremiereVision* software. Its proprietary (patent pending), real-time, Internet-based service allows users to monitor, manage, and communicate all critical information for their vineyards, from pruning through wine production, via the Web.

Developed by Premiere Viticultural Services, Inc. (Napa, CA), a vineyard consulting and technology outsourcing firm where Freese is a partner, *PremiereVision* has undergone three years of development and extensive testing.

"*PremiereVision* is a very focused application developed specifically to enhance viticultural record keeping, communication, and decision-making," says Steve Matthiasson, President of Premiere Viticultural Services, Inc.

"It's a great program," says Cakebread. "It allows vineyard managers or wineries to make informed and practical decisions, because they can view data that is rolled up to show the 'big picture,' or they can drill down into data to look for the reasons for trends. That's what we need to make great wine."

Cakebread Cellars acquired the software to help manage the significant changes in vineyard technology added over the past several years. "There is an explosion of information and analyses available to winegrape growers," notes Matthiasson. Irrigation is one example.

"Years ago, the vines would get one long drink in the spring — we thought that would be enough until harvest," Cakebread recalls. "Today, we use a leaf-water potential and neutron-probe monitoring service (Dana Zaccone, GeoVit Vineyard Services, Napa, CA) that allows us to accurately measure how much water vines are using and how much irrigation is needed to grow better grapes."

Weather data is another technology addition. "Our vineyards are in many different climate zones, from valley floor to mountain tops between Calistoga and Carneros in Napa County, plus Anderson Valley (Mendocino County)," says Toby Halkovich, viticulturist at Cakebread Cellars. "We need local ET (evapotranspiration) and degree-day data, which requires multiple weather stations. We use Picovale Services (Sacramento, CA) for its real-time

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satellite uplink and integration into *PremiereVision*."

Remote sensing is another key data source for Cakebread Cellars. Both relative and calibrated normalized difference vegetation index {NDVI) images from VineView Imaging (St. Helena, CA) are commissioned annually in early August for estate vineyards and selected grower vineyards and fed into the *PremiereVision* database. These images are essential to achieve uniformity in the vineyards. Weak and strong areas can be identified and vineyard farming strategies implemented to mitigate impacts of those areas.

"We have so much data," explains Halkovich, "we need to be able to pull it all together into one big picture that allows us to make good, timely decisions. *PremiereVision* helps us do that."

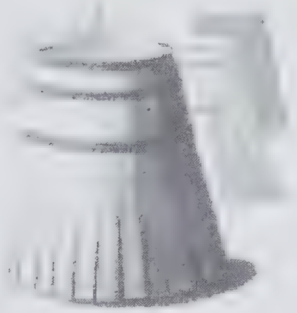
Planning at Cakebread Cellars

The planning process at Cakebread is outcome-focused, starting with the wine and working backwards to vineyard planning. Wine lots from different sites, clones, and rootstocks are tracked separately, and the wine characteristics from the different lots are used to drive the vineyard planning process.

Planning for the vineyards is a multi-year process, with constant adjustment based on outcomes. "I call it the 'spiral staircase,'" says Freese, "where one creates a 'game' plan for a growing season, using best practices, and then executes the plan, learns from it through rigorous record-keeping and observations, revises it, and then incorporates lessons learned into the next season's planning process, constantly moving up the staircase of quality.

"It is an iterative process, spanning multiple years, with the focus primarily on the wine outcome. We incorporate new information to influence the evolution of the wine styles and characters toward the goals."

To facilitate this process, *PremiereVision* developed a module for creating farm plans, which can be modified during a growing season to adjust for seasonal factors, such as weather, vine growth, and pest issues. The farm plan module provides a comprehensive and specific plan for each phase and activity in vineyards during the crop year. This module provides tools for creating work orders and recording actual events and their timing so that the information is retained and readily available for the next year's planning cycle.



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Phenology timeline

The "phenology timeline" is a critical component of *PremiereVision*. Freese brought the concept with him when he partnered with Premiere Viticulture in 2003. "The phenology timeline is a drumbeat," explains Freese, "marking time throughout the season. Each site and variety have a certain timeframe between bloom and harvest. Weather may advance or delay the timing of events a minor amount, but the pattern in each vineyard continues.

"The vineyard farm plan attempts to determine the timing and extent of operations in relation to the phenology timeline, but when bloom starts, the job is to execute. The farm plan and phenology timeline enable us to anticipate and hit the timing of key events correctly."

On a trip through France in 1976, while traveling with Andre Tchelistcheff, Freese had the concepts of phenology stages and the regularity of the vine's seasonal development brought home to him.

"The simple side of the regularity is that the French seem to plan their summer holidays for August and always seem to know when the harvest will begin," explains Freese. "Further examination of seasonal records shows that the different regions had their own periodicity, something that we also have in California, and it can be used very effectively to anticipate inputs to the vineyards, such as water management for desired control of vine vigor at key stages, for example."

Halkovich agrees: "Integrating our vineyard farm plans with real-time phenology allows us to predict upcoming events and be pro-active. Third-party weather data provides real-time degree-day data to help track phenology and determine where we are with the timeline for each vineyard."

The phenology timeline is the core of *PremiereVision*. It starts with the planning process, utilizing user-created templates to create farm plans for each vineyard block. Each farming activity is linked to a specific phenological event, so the planned start/stop dates can be adjusted according to the seasonal variations in actual phenology dates.

Freese emphasizes that the "timeline" is linked to the phenological cycle of the vine in relation to the flowering date, and is not based on a calendar date. "As we know, we have 'early' and 'late' seasons relative to the initiation and completion of the vintage," he adds. "But the elapsed time between events is very regular, even if flowering is later or earlier in a given growing season. This tool is used extensively by other growing regions and seems to have been overlooked in our vineyard practices."

At Cakebread Cellars, once the farm plan for each vineyard is completed, it is linked into the *PremiereVision* application. Users with different roles in the organization access the aspect of the application appropriate to their position. Cakebread vineyard managers can create work orders based on the plan. Cakebread or Freese can view summary data or charts, or drill down to see details of specific activities.

Cakebread Cellars / PremiereVision development

When the concept of *PremiereVision* first arose, Premiere Viticulture was already developing farm plans in grower vineyards supplying grapes to Cakebread Cellars . Cakebread Cellars agreed to provide development input on the new software application and to beta-test it. "We saw an opportunity to be able to help shape, specifically to our needs, what was already a well

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thought-out software application," says Halkovich.

During beta-testing of the initial software in the 2004 season and use of the completed application in 2005, Cakebread Cellars gave input into the design of several modules, especially the farm planning and phenological functions.

"Input from Toby and Bruce has been invaluable — no one else we know understands and focuses as intensively on the planning and operations tracking process," says Matthiasson. "In addition, Bruce's long-term approach meant that he was comfortable with a 'work-in-progress' application, because he knows that, like him, we are committed to a continual feedback/improvement loop. The spiral staircase of quality concept!"

Premiere Viticultural Services' extensive experience in viticulture and vineyard management was critical to Cakebread Cellars participation in the project.

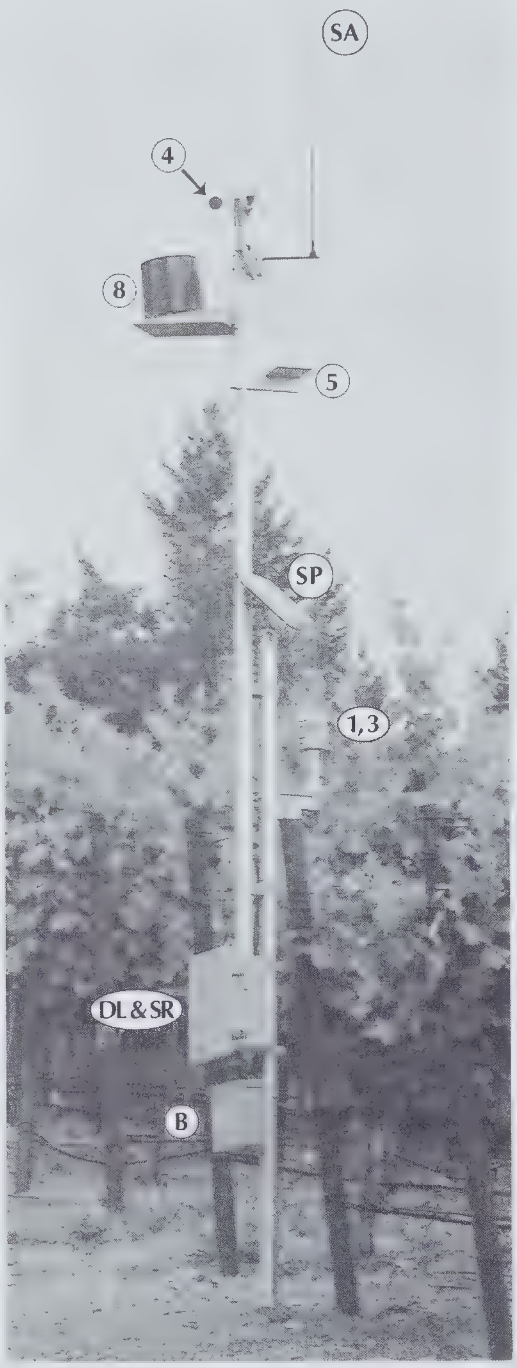
"It was important for us to know that we were dealing with knowledgeable vineyard people, not just programmers," says Halkovich. "*PremiereVision* is not just a database of information — the application is practical and relevant. It was developed by premium winegrape growers for premium winegrape growers."

Cakebread Cellars' weather stations

Based on Cakebread Cellar's requirements, Picovale Services, Inc. installed weather station equipment, to provide weather monitoring and alert services, that utilizes direct satellite communication and solar power, eliminating the need for costly infrastructure that a traditional radio system typically requires. Another benefit is easy movement of a station to another vineyard location without requiring additional power or communication support.

Three stations (in photo) have eight environmental sensors:

1. Air Temperature Sensor — measures air temperature outside vine canopy;
2. Canopy Temperature Sensor — measures air temperature within vine canopy (about 15 feet down trellis wire);
3. Relative Humidity Sensor — measures relative humidity;
4. Wind Speed Sensor — measures wind speed;
5. Solar Radiation Sensor — measures solar radiation;
6. Soil Moisture Sensor — measures percent of available moisture by volume (buried in ground about 10 feet down vine row);
7. Leaf Wetness Sensor — measures periods of leaf wetness after rainfall, dew, or spray (about 15 feet down trellis wire);
8. Precipitation Sensor — measures current and accumulated rainfall.



B = Battery; DL & SR = data logger, satellite radio; SA = satellite antenna; SP = solar panel

The internet-based monitoring service provides the mechanism to securely retrieve data from each station allowing Cakebread Cellars personnel to view current and past weather information.

With this particular sensor set-up, the monitoring service calculates and provides: dew point, ETo, accumulated degree days, a botrytis risk indicator, a powdery mildew risk indicator, and development cycles for five common vineyard pests (Orange Tortrix, Omnivorous Leafroller, Western Grape Leafhopper, Western Grapeleaf Skeletonizer, and Pacific Spider Mite).

The online monitoring service has an interface providing sensor-alerting capabilities. This feature allows Cakebread Cellars personnel to set critical sensor threshold values and then be notified via e-mail, telephone, pager, or text message when a particular threshold has been reached.

Although not currently used by Cakebread Cellars, the stations have the ability to turn irrigation valves on or off, start wind machines, monitor vineyard-gate access, monitor water flow, and monitor reservoir and/or irrigation pond levels.

The web-based *PremiereVision* application requires no special software or hardware, or in-house computer expertise, beyond having computers with a browser and a connection to the Internet. All data is stored and backed up offsite on secure Premiere servers.

Users can enter data or work with the data wirelessly in the field from a laptop or a PDA. Any member of a client's management team, if given a password, can access the data over the Internet at any time. This platform allows multiple authorized users to access the system and all of its data simultaneously, according to their specific role. All of the data is secure and confidential with access to all data solely controlled by the client.

"The aspect of *PremiereVision* that convinced us we had made the right decision was Premiere's responsiveness and adaptability in making requested changes and enhancements to the program," adds Halkovich. "They have really worked hard to make this work well for us."

An added bonus to Cakebread Cellars was that other leading premium winegrape growers were also utilizing *PremiereVision* during the 2004 and 2005 crop years and providing input to improve the application. Premiere Viticultural Services continues to invite feedback from all of its clients with the goal to continually improve *PremiereVision's* functionality.

"We're interested in where the application is today, but we are even more interested in where it is going, where it can take us." adds Halkovich. "That is where *PremiereVision* shines." ■

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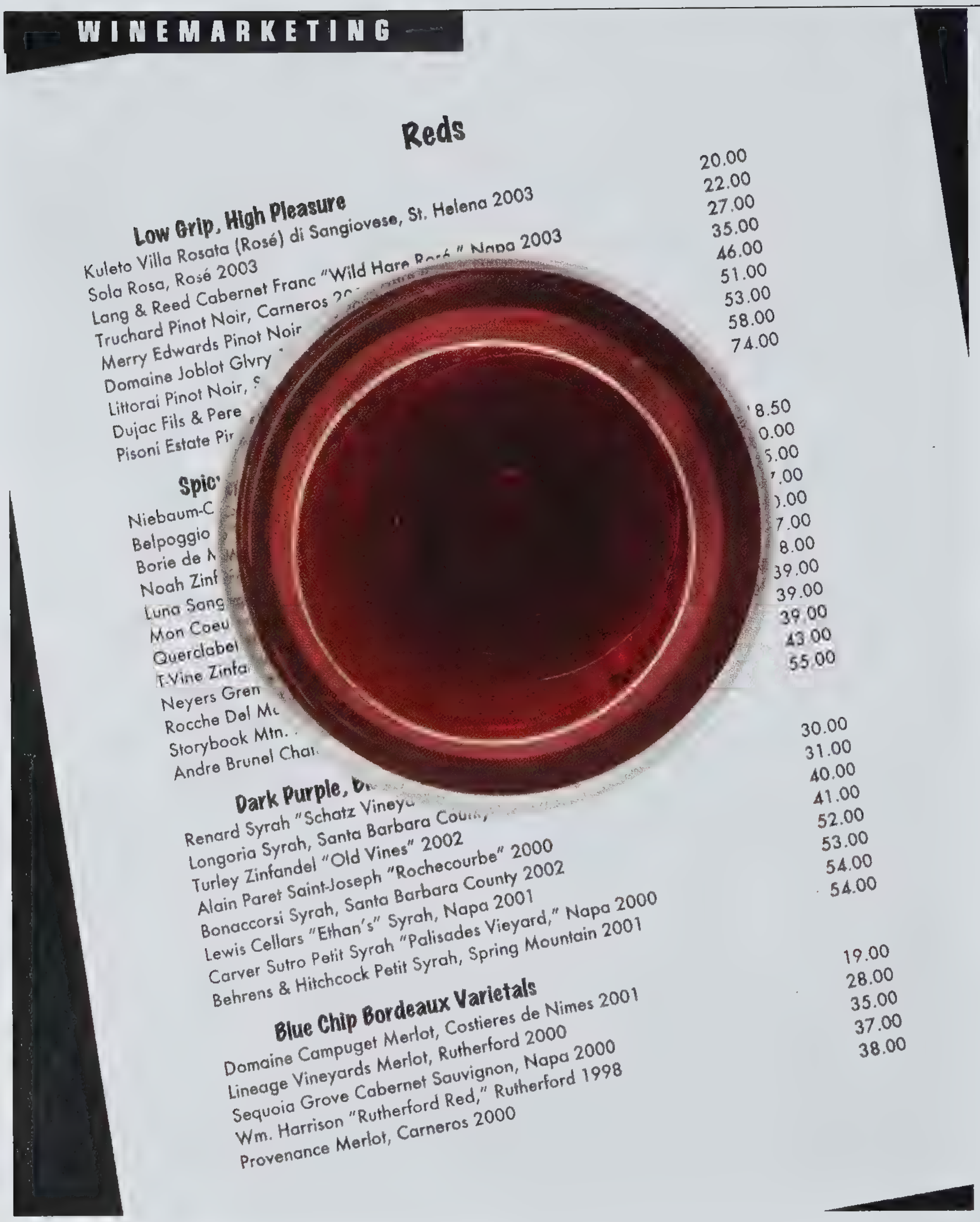

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INSIDER TIPS

Selling wine to restaurants

BY Tina Vierra

You want to sell your wines to restaurants. You want them to do well once they get there, generating consistent re-orders, regular placement on the wine list, and perhaps elevation to the wine-by-the-glass list, where hundreds of diners will enjoy them. To help you achieve these goals, *PWV* asked restaurateurs to offer wineries (and distributors) some "Do's and Don'ts" from a restaurateur's perspective.

PWV thanks the panelists for their insights: Nick Peyton, partner and general manager of Market, St. Helena, CA; Sondra Bernstein, owner of the girl & the fig, Sonoma, CA; Dan Berman, former co-owner of Mixx Restaurant, Santa Rosa, CA, head wine buyer for Fiesta and Star Markets, Sonoma County, CA; Randal Caparoso, winemaker and former partner/wine manager of Roy's Restaurants, Hawaii; Danielle Price, head wine buyer for Smith & Wollensky Restaurant Group, New York, NY; and David Laxer, owner of Bern's Steak House, Tampa, FL.

Know the restaurant

Know the restaurant, its wine list, and its menu before making your pitch. A restaurant specializing in all Rhône varietals and blends, such as the girl and the fig, would not need to see your list of Bordeaux blends.

Nick Peyton has organized his wine list by fun flavor descriptors rather than the common varietals or regions, so a winery representative having similar descriptors of his/her wines would be one step ahead. Your thoughtful perusal of a restaurateur's menu and wine list will give you better sales tools going into the meeting with the restaurateur and save both parties time and trouble.

Dan Berman's favorite example of a distributor's wine representative who really knew his restaurant is a man who is now a winemaker. The former rep called Mixx (already a client of his firm) to introduce himself as the new rep, came in for the first time by appointment, and asked questions about Mixx and its wine program, price point, by-the-glass needs, and more. When Berman asked if he'd brought samples to taste or present, the rep replied no.

"He said he wanted to know Mixx first and not waste my time with presentations before he did," Berman recalls. "He promised to bring in the right stuff at the next meeting and from then on. This rep did his homework, learned our account, and throughout our relationship, kept current about the restaurant. He never brought more wines than we wanted. He was a truly great rep."

Dropping in

If you drop in, expect the restaurateur to be too busy to see you. The panel stressed two tips in this situation: leave literature and follow up. You dropped off a few sample bottles for the buyer to try. Fine and good, but make sure you leave literature with them, not just a card or a note. Follow up with a call or an email. In a busy restaurant environment, the buyer might not have gotten your samples or may have loved your samples but lost your card.

Berman stresses persistence. "Have a 'restaurant mentality.' Selling wine to restaurants, is different than selling to retail. You must be prepared for rejection. Maybe they don't need your wine now, but might later. Look for whether people are just giving you lip service or being straight with you. A restaurant has timing issues, menu needs specific to a given time. If you want to be successful, be consistent with your restaurant and don't get discouraged. Calling twice, three times, may not be enough. Keep going."

Sommeliers and wine buyers

Work with the staff member assigned by the restaurateur to review and buy wine. If they want you to work with the sommelier, don't pitch the owner and the chef.

Educate, educate, educate

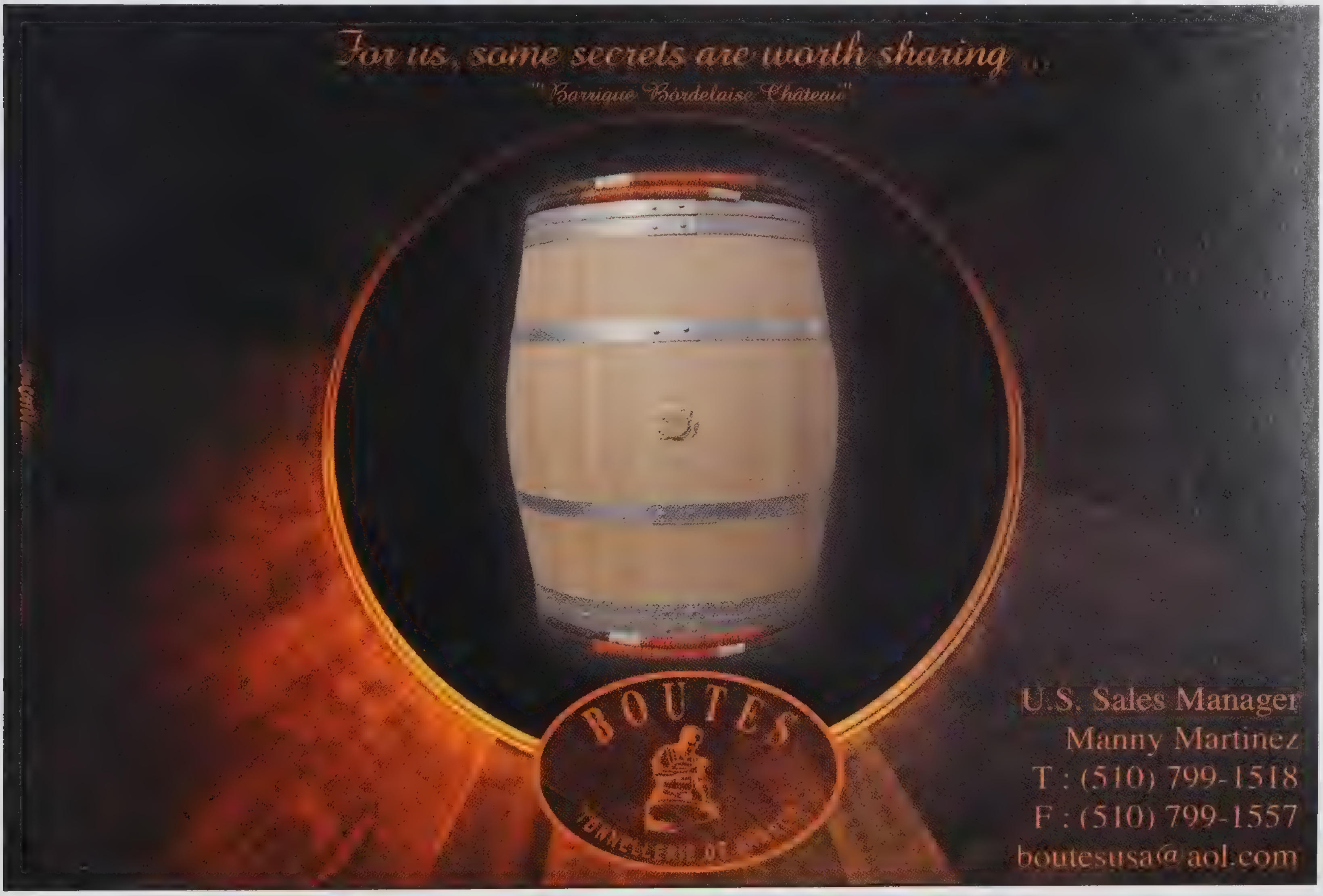
Wines are most effectively sold in restaurants when the staff can knowledgeably discuss the wines with customers. Staff members usually have only a few brief moments to make an impression on guests. Winery representatives can help by providing lots of information. Restaurateurs suggest a number of ways to do this:

- In your initial presentation, be prepared, pour, present briefly, and leave fact sheets for later perusal;
- Include full winemaking data about each wine for the restaurateur: ratings (especially if the wine got a great rating!), tasting notes, and press coverage. In addition, offer food/wine pairing information from the winery's experience and anecdotal information about each wine;
- Schedule a tasting at the restaurant's convenience for the benefit of its staff. Bring full winemaking notes and enough copies for everyone;
- Take the restaurant staff on a tour of your winery if it's feasible, with a full educational tasting in your tasting room or cellar.

"Anecdotal information is a key sales tool for me, even more than standard winemaking notes can be," says Peyton. "Given the neighborhood atmosphere of our restaurant, anecdotes about anything from growing season trials in the vineyard to the winemaker nicknaming a pet wine can help me talk about wine with my customers and, thus, sell it more successfully."

Danielle Price emphasizes staff training. "I can't tell you how many winery representatives are unhappy with the business they're doing in our restaurants, yet have not supported their product through staff training," she says. "Education is the most effective way to sell wine, period."

Berman held regular, casual Friday tastings and monthly meetings with his staff. At the Friday meetings, staff were given wines already on Mixx's wine list and allowed to taste and ask questions about the wines and how they will pair with the food on Mixx's menu. Winery reps were often invited to this tasting and left alone with the staff to chat. Berman says the staff liked the informal and unintimidating atmosphere of these tastings.



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Wine by the glass

Support wine-by-the-glass programs. "Restaurateurs have a hard time making wine-by-the-glass programs profitable, yet at the same time, such programs account for the largest volume of wine sold and highest popularity with customers," reports Randal Caparoso.

The winery that gets its wine onto a by-the-glass list will likely sell more wine than by the bottle, thus raising its profile with consumers. Wineries need to support wine-by-the-glass programs by making case goods available, delivering frequently if a wine is popular, and by helping with price-points.

"Wine-by-the-glass pours are the lifeblood of restaurant wine programs," Caparoso notes. "It can mean the difference between selling one case every six months or five cases every week."

Restaurants generally mark up by-the-glass pours three to four times, or as Bernstein does, take the bottle price and divide by three or four to price each pour, with five pours from a bottle. The winery needs to give a significant price break so the wine will sell profitably for the restaurant. The bottle price from the winery to a restaurant is set by determining what price will suit a restaurant's customers.

No surprises

Don't surprise a restaurateur with your shipment. For instance, if you are sending a new vintage of a wine, notify the restaurateur in advance and allow him/her to taste it. Send new winemaking data and tasting notes about new vintages or changes in flavor profiles in your wines. Make a call or send a memo about new pricing. Don't send the wines without warning and assume a restaurateur will accept changes to your portfolio. The restaurateur will need to update the chef, work out changes to food/wine pairings, or reprint their wine list if a wine changes.

Bargain pricing and sales contests

Pricing specials rarely lead to a permanent place on the wine list. Some restaurateurs will take your 30-day special price but will only carry the wine for that time period and not reorder. Others may forego the special price altogether, rather than risk customer wrath by raising the price later.

At Mixx, Berman often takes advantage of sales contests for his staff that were sponsored by wineries or distributors. The contests were fun for the staff, kept spirits up, and boosted wine sales. Prizes varied from a magnum or 750ml bottle of wine to a winery T-shirt or gift certificate to another restaurant. Once the prize was use of a house at Lake Tahoe a winery owned. Berman didn't like to drive these contests, but let the winery pick the prize. Mixx matched a floor staffer with a kitchen staffer, so prizes were either doubled or split.

One big drawback to contests, however, is that staff tends to push just one wine (or one winery, depending on the contest). But the big benefit is that the

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restaurant exposes a certain wine or winery that customers may not know.

Taking advantage of a relationship

Don't take advantage of the winery/restaurant relationship, which can be tempting when you live nearby and patronize a restaurant frequently. "Taking advantage" could be anything from bringing off-list wines (and not wanting to pay corkage) insisting on sharing wines with a busy restaurateur, or giving away wine to neighboring tables, reducing restaurant sales potential at those tables.

A winery owner or representative out with a group of friends for an evening is a most welcome patron at any restaurant, but the restaurateur may not have time to spend chatting and tasting your wines with you. The restaurateur will feel obliged to do the courteous thing and try your wines, though any nice comments made about them should *not* be construed as a sale. In this situation, you are a special guest, but one of many, possibly placing difficult demands.

Saturday night at the height of business is not a good time for a wine sales call. Make an appointment for a better time.

Respect the law and the license

When you are a customer or are bringing items to a sales meeting during the restaurant's business hours, do not bring open or unlabelled bottles. According to the laws in many states, such wines cannot be poured. Help the restaurant by knowing and respecting such laws. Making an exception for you could cost the restaurant its liquor license.

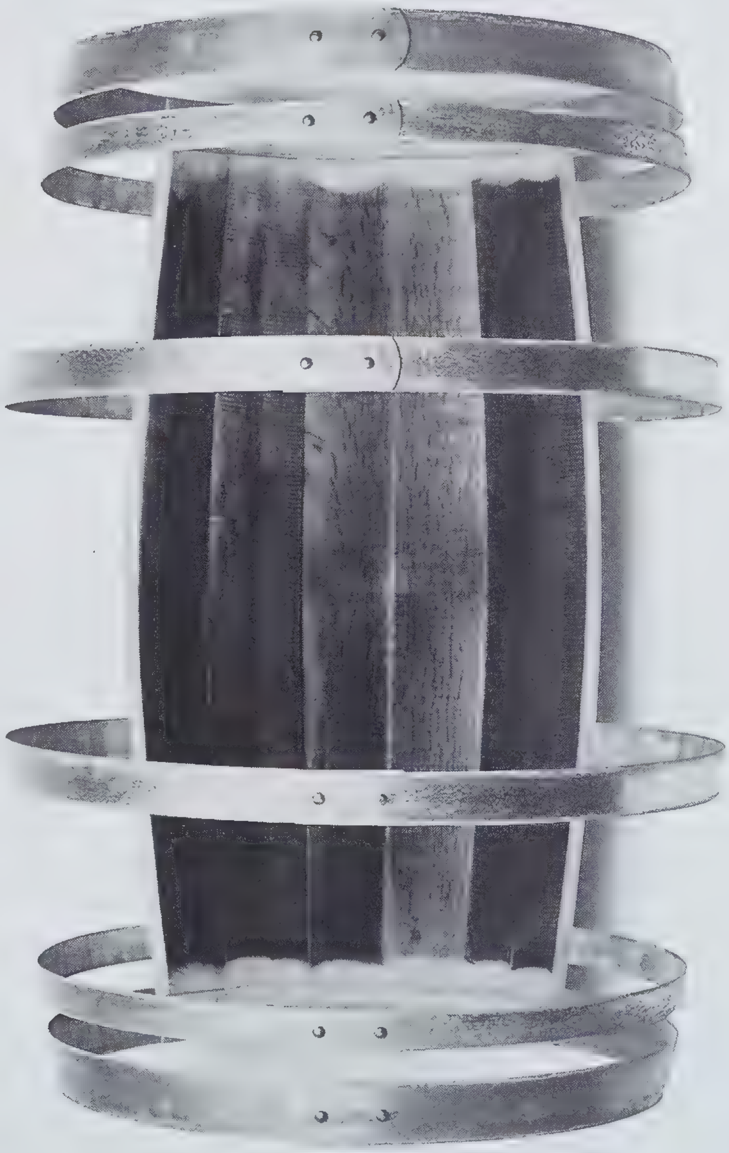
Remember your restaurateur in good times and bad

"If you have a favored relationship with my restaurant, throw me a bone once in a while," Peyton suggests. "Such as wine for an employee event, a special price. Some gesture that makes me feel special and makes you special to me."

A case of wine donated for a restaurant staff event could be money well spent, as the staff will know the wine well and be able to sell it. Offer a discount to restaurant staff who visit your winery's tasting room or order your wines for personal use. Send recipes from the winery chef to the restaurant chef with a bottle of wine, so the chef might try the suggested pairing. Any gesture that serves the winery-restaurant relationship in a positive manner will make your wines more welcome on their list.

"If I have supported you in the past, think of me come allocation time. If the news is bad, make a personal call," advises Peyton. Restaurants do their best to support local wines and small wineries, but supply can be limited. If a winery can't serve its same client list because of the small vintage they produced this year, the clients who won't be getting the wine deserve to know in advance.

Berman feels restaurants don't shop for distributors as carefully as they should — and neither do wineries. As



Do you really always get what you pay for? With traditional barrels, you don't. In fact, 80% of a barrel's oak is for structure, and will never make contact with the wine. Typically, that amounts to only 7 staves that impart flavor, and 26 staves to hold it all together. Please call to hear some of the sound options we offer to do more with less.

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a restaurateur in Sonoma County wine country, in constant contact with a myriad of distributors and small wineries, he's seen many a mismatched winery-distributor relationship.

"One of the things that comes out with distributors is that they need to be a good fit for the winery," Berman cautions. "Is the distributor being up-front and open? What are the expectations on each side? Is your distributor going to follow through for you?" These are just a few of the questions he feels need to be asked.

Wineries should know where they want their wines to be placed, both geographically and in which venues. That decision, once made, will have a lot to do with which distributor the winery should choose. As an example, Berman describes how the Henry Wine Group used to sell wines in Los Angeles and southern California, but not northern California.

Now they distribute in northern California also, which should affect whether a winery finds this distributor a good fit. The expansion changes what wines Henry Wine Group can or will carry and what they will do with those wines.

"If you're looking to sell in a small market, maybe you don't want to use a large, nationwide distributor," advises Berman. "Go in understanding who you are, where you want to be now, and where you want to be in future. Get a distributor to commit to you — to show you in writing that they can/have handled wines like yours, with similar goals. You have a right to ask for that information and they should show it to you."

Resistance to closures

While restaurant owners and managers are pretty savvy about alternative closures, waitstaff and customers are still resistant. The "romance of the cork" is perhaps strongest in the restaurant setting, and restaurateurs report that customers ordering by the bottle are still not loving screwcaps. "On lighter, crisper whites and less expensive brands, resistance is lessening," reports Peyton.

On the other hand, TCA is an invisible enemy of restaurateurs and their wine lists. Most consumers still don't know they're tasting a corked wine and think the wine is simply bad. The reputation of the wine and the wine list are spoiled, and the customer will probably say nothing. "They just suffer in silence and don't bother to come back," says Caparoso, who champions synthetic corks for restaurant wines.

For bars and wine-by-the-glass programs, where screwcaps and TetraPaks and bag-in-boxes won't be seen, alternative packaging is acceptable, the restaurateurs agree, especially if it will keep prices low for wines by the glass.

What is the "hot" price point?

Bottle price-points that will sell well in any given restaurant depend on the location, the menu, and even the time of day. Lunch crowds order in the $20 to $30 range, most of our restaurateurs

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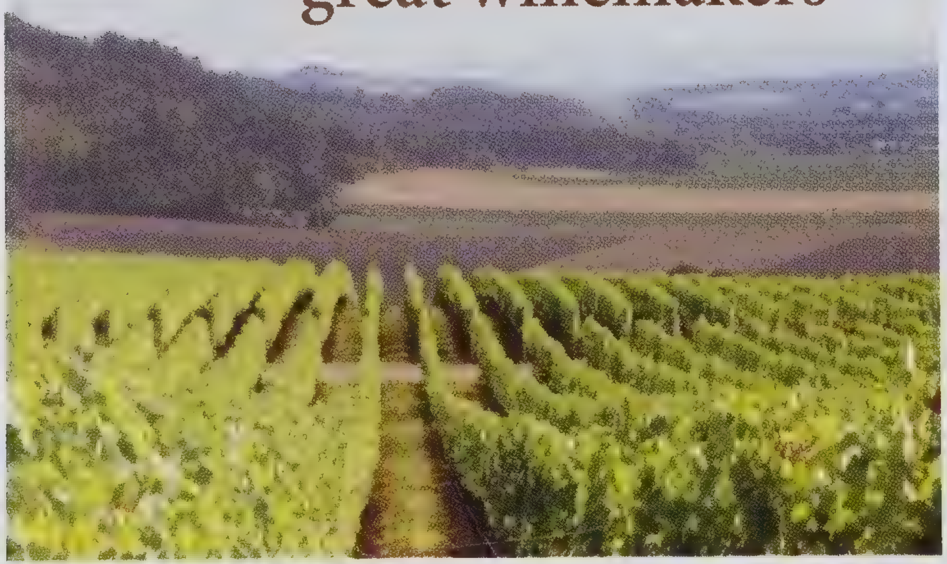

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agree while dinner crowds at one restaurant on our panel average $35 to $50 and at another $30 to $40. Caparoso believes the wine price will correspond with the amount spent on the diner's food check. Allowing for the restaurant's markup, wholesale prices on the most frequently sold restaurant wines these days range from $5 to $25.

Berman's mantra is: "The price of the food on the menu should impact the price of the wine the restaurant will carry." A restaurant with $20 entrees, for example, shouldn't be pairing them with $60 to $70 wines. Berman priced wine no more than two to 2½ times the price of an entree — a formula suggested by wine writer Dan Berger, which Berman feels works well.

"Mismatched wine and food prices won't sit right with customers," explains Berman. "A moderately priced restaurant draws its customers by price point and accessibility. If the wine list is $100 wines and it's hard to find a moderately priced wine, the customer is confused and feels guilty trying to hunt down the cheapest wine on the list, rather than what they really want to drink with their food. It throws them for a loop. The key is to sell wine with your food. There's no point in stocking expensive wines that sit."

New blood for the list

You are an emerging winery, have a new brand to launch, or are adding new varietals to your line this year. How do you get them onto restaurant lists? Education was Bernstein's reiteration. Send literature about the new wine — what makes it good, makes it different, or makes it a perfect fit for the restaurateur's wine list.

Caparoso stresses the "partnership" of the winery with the restaurant, building a good relationship and introducing new wines into an existing track record. Always send your best tasting (not necessarily the highest-priced) wines, and the restaurateur is going to want the next wine you bring into the relationship.

Danielle Price is always looking for new wines. "I try to avoid purchasing wine that is widely available in retail shops," she reports.

"All menus are in flux to a certain degree," notes Berman. "Seasonality dictates, along with the need to mix heavy and light dishes. With a good wine list, you want to offer a variety of styles and flavor profiles, just like the menu does, to hit the different tastes or moods of customers."

The Mixx wine list was changed every six to eight weeks, since the size of the restaurant allowed Berman to store small quantities of wine. Mixx had a few high alcohol wines, which dictate a menu of rich, high-fat dishes to offset them, but favored wines with good acidity and a nice balance.

"For a restaurateur, there's nothing in the world like turning someone onto something they've never had before," says Caparoso. "When they respond by saying it's the best they've ever had in their life, that's a home run!" ■

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EURO-MACHINES, INC.

Euro-Machines offers the new type EVP Europress Basket Press in basket sizes of 300 liter, 500 liter, 900 liter, and 1,500 liters. This new basket press is available with painted mild steel frame or fully stainless steel frame.

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PLEASE SEE EURO-MACHINES AD, PAGE 79.

FOGMASTER CORPORATION

Fogmaster's new Sentinel-5850 barrel-room humidification system brings innovative atomization technology to small- and mid-sized wineries. It uses a turbulent-vortex nozzle to atomize water into micro-droplets that evaporate quickly and spread uniformly throughout the barrel room.

The control unit (pictured) monitors relative humidity and regulates water flow. A regenerative blower, designed for efficiency and low-maintenance cost, provides air to atomize water. When humidity drops below the set point, the control unit activates the system and the nozzle ejects a fog of tiny droplets. The droplets evaporate quickly and raise humidity so barrels stay dry. Because the nozzle has no tiny orifices, nozzle plugging is not an issue.

Designed for "do-it-yourself" installation, the Sentinel-5850 includes all installation components except the two-inch PVC pipe needed to convey air from the blower to the nozzle.

A single nozzle system can maintain a 5,000-sq.ft. barrel room. A cart option is available for users requiring mobility.

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Deerfield Beach, FL 33442
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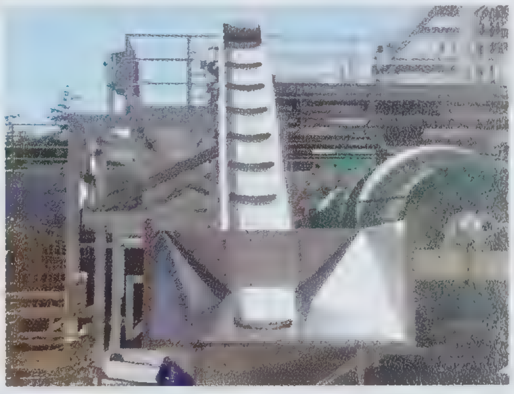
PLEASE SEE FOGMASTER AD, PAGE 66.

OGLETREE'S, INC.

For 60 years, Ogletree's has specialized in custom fabrication of winemaking equipment. By relying on the continual pursuit of innovation and the company's historical stability, Ogletree's is able to optimize value and quality to satisfy the wine industry's needs, while providing customers with the security that the job will be done right the first time.

Ogletree's manufactures high-quality hoists, receiving hoppers, belt and screw conveyors, sorting systems, transfer lines, catwalk systems, and more. Ogletree's provides maintenance on all equipment offered.



Ogletree's years of service to the wine industry serve as a foundation to its design team who design a superior product by collecting input from clients and focusing on specific needs. By utilizing solid quality-control procedures and a precise six-point inspection, Ogletree's team of experienced fabricators deliver products second to none.

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PRO REFRIGERATION, INC.

Pro Refrigeration is a leading manufacturer/supplier of refrigeration equipment to the wine industry. Pro Refrigeration's ever-growing Proformer™ refrigeration equipment product line includes much more than the Pro Chiller System; they've amassed a complete line of equipment to handle the refrigeration needs of any size winery. The Proformer™ Product Line includes: plate and tubular heat exchangers for juice cooling; storage room cooling coils and controllers; storage tank temperature controllers; multiple tank temperature control centers, and much more.

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Pro Refrigeration's newest product is the "Classic" Chiller System Series designed specifically for wineries that have outgrown their existing chiller system. These self-contained, packaged chiller systems add capacity to any existing glycol chiller system without any field refrigeration piping.

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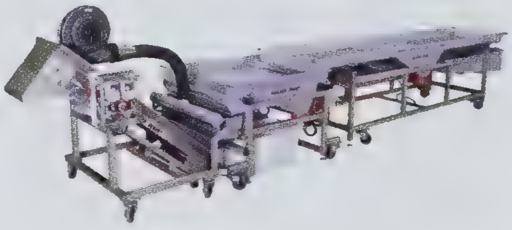
SCOTT LABORATORIES, INC.

Scott Laboratories introduces two new and innovative items to the wine industry.

The Mistral automated sorting table by Vaucher-Beguet performed efficiently and effectively in its first year of production at Napa, Sonoma, and Bordeaux wineries. Vaucher-Beguet vibrating sorting tables are specifically engineered for grapes and automatically remove shot berries, broken berries, and green material while collecting free run juice. The Mistral system uses an innovative sorting system to remove several tiers of quality, leaving nearly 100% whole, clean berries with little to no manual input.



Vaucher-Beguet automated grape sorter.

The second product is the AiroCide PPT system designed to remove airborne contamination. A unit mounted on a winery wall circulates air, killing airborne molds, bacteria, yeasts, and removes volatile organic compounds (VOC's) such as TCA and TBA (trichlorolanisol and tribromalanisol). This unit produces no ozone and is continuous in operation. Current winery case studies have shown reductions of airborne mold populations in barrel and cave storage ranging from 57% to 72%. Units help reduce risk of airborne microbial and anisole contamination (especially in humid winery settings).

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STOKES LADDERS, INC.

A leading manufacturer of aluminum orchard ladders for more than 40 years, Stokes Ladders, Inc. offers quality rolling barrel-room ladders specifically designed to fit in narrow aisles between stacks of wine barrels. Now used in over 60 west coast wineries, these ladders provide workers safe access to barrels without having to climb racks, and eliminate having to lower barrels with a forklift to be inspected or topped.

Ladders can accommodate stacks up to six barrels high. The height of the ladder, combined with a narrow 18-inch width, allow for maximum barrel count in a barrel room.

The ladders are constructed of high-strength, light weight structural aluminum, and feature four heavy-duty, non-marking locking casters, a roomy 16-inch x 24-inch top platform with handrails and toe boards, 7½-inch deep steps, and a comfortable 60° climbing angle.

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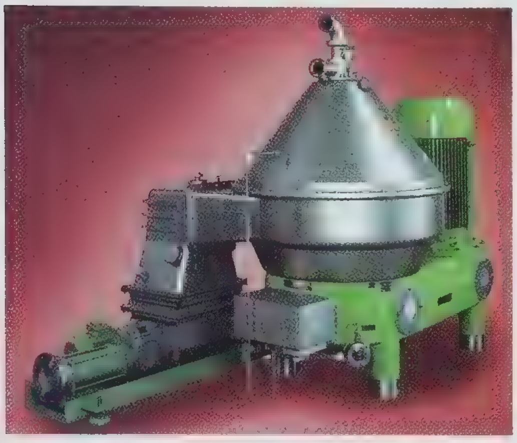

Westfalia is a leading manufacturer of high-performance centrifuges and systems for the wine industry. A member of the Separator Division of GEA, Westfalia is uniquely positioned to provide innovative solutions that meet your separation requirements.

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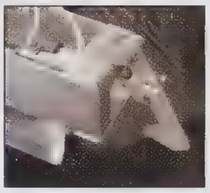
FM SHEET METAL INC.

FM Sheet Metal Inc. has released their latest design of a pneumatic punch-down device for open top fermentors.

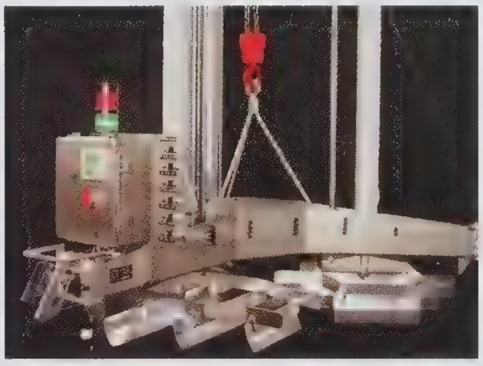
This device features a self-centering tank-mount design with an innovative automated rim-clamp feature on three support arms. Three pneumatic cylinders and hinged-blade feet offer the most gentle cap-turn with minimal maceration, with fully programmable cylinder speed and cycle count. A three-position selector switch enables an operator to easily choose from three pre-determined program selections based on fermentation stage and cap density.

The device clamps onto the fermentor rim to begin a punch-down cycle. Cylinder timing is configured so that as one foot reaches the bottom of a stroke, the next cylinder starts down so the feet pass one another about mid-tank. This maximizes a very gentle and thorough cap-turn.



Pneumatic rim clamp.

Indicator lights signal the operator when the cycle is running and cycle completion.



Currently available for 60-inch to 96-inch diameter fermentors.

FM Sheet Metal Inc. has 15 years of experience with design and fabrication of custom-manufactured pneumatic punch-down systems and other equipment for Pacific Northwest wineries.

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e-mail: rbrigl@fmsheetmetal.com

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KOCH MEMBRANE SYSTEMS, INC.

Koch Membrane Systems, Inc. (KMS) introduces a new hollow fiber crossflow microfiltration (CMF) membrane designed specifically for the wine industry. The new membrane is sturdier, more productive, and easier to clean than previous membranes, and does not compromise wine quality. New six-inch diameter cartridges house fibers, giving up to 60% higher capacity compared to the standard five-inch KMS cartridge.

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With KMS crossflow filtration, a feed stream flows parallel to the membrane surface at high velocity as compared to the perpendicular flow path in conventional depth filtration. By keeping suspended material from settling, crossflow filtration minimizes membrane solids build-up, delivering high permeation rates, and maintaining stable throughput. CMF provides a one-step process, eliminates multiple diatomaceous earth filtration steps, reduces filter replacement, and allows a continuous filtration process.

The new fiber and cartridge are incorporated into a newly designed series of wine filtration systems taking advantage of wine fiber characteristics. Low-cost systems containing two to four, 6-inch diameter cartridges, suitable for a small winery budget, are available.

Koch Membrane Systems, Inc. has been a global leader in separation and filtration products for over 30 years. A designer and manufacturer of state-of-the-art membrane cartridges and elements, and complete membrane systems, KMS provides solutions for demanding applications.

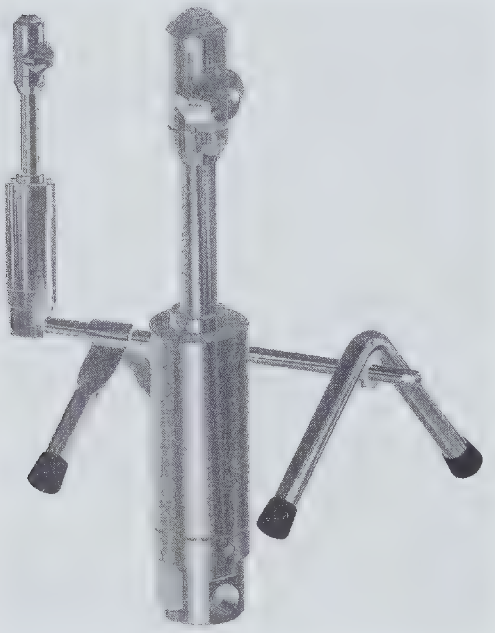
For more information, contact:
Koch Membrane Systems, Inc.
850 Main St., Wilmington, MA 01887
tel: 888-677-5624
e-mail: info@kochmembrane.com
website: www.kochmembrane.com

PLEASE SEE KOCH MEMBRANE SYSTEMS AD, PAGE 131.

GAMAJET CLEANING SYSTEMS, INC.

Gamajet introduces its latest innovation in barrel cleaning technology, the HD Barrel Blaster. For users accustomed to the Gamajet method of "bottom up" cleaning, the new Gamajet HD Barrel Blaster offers three times the service life of the current Gamajet E-Z7. Heavy-duty construction and a large gearhead prevents damage, and the powerful 360° cleaning spray ensures full cleaning.

The unit is one of the strongest and most durable barrel cleaning systems available. The HD Barrel Blaster is simply inserted through the barrel bunghole for fast and easy cleaning. No rotation of barrels is required.



The HD Barrel Blaster is designed to be easily retrofitted into the Tom Beard Wash Station for increased barrel cleaning convenience.

Also available is the Evacu-Blast HW, a portable hot water barrel wash system that allows users to clean barrels with hot water and empty them in place without the need to rotate or move barrels.

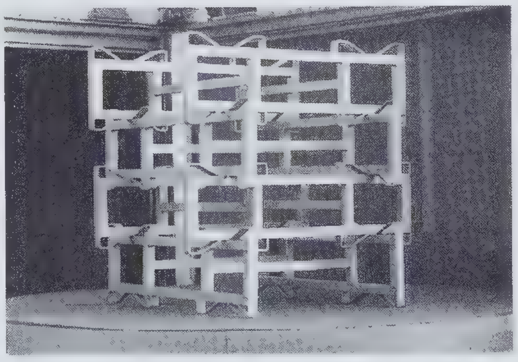
Gamajet is the leader in cleaning technology for the wine industry, providing a "Better Way to Clean."

For more information, contact:
Gamajet Cleaning Systems, Inc.
PO Box 626, Devault, PA 19432
tel: 877/426-2538; fax: 610/408-9945
e-mail: sales@gamajet.com
website: www.gamajet.com

PLEASE SEE GAMAJET AD, PAGE 34.

TOPCO, INC.

Topco, Inc. manufactures and supplies wine barrel racks of all styles, materials, and powdercoat colors to wineries. Topco focuses on innovation, quality, integrity, honest and friendly service, reasonable competitive pricing, and newly implemented refurbishing of barrel racks.



When Topco began manufacturing racks in Grover Beach near San Luis Obispo, CA, the deleterious effects of forklift handling combined with an acidic winery environment limited barrel service life to about five to seven years, when refurbishment would be needed.

Topco developed the capability to extend barrel rack service life by refurbishing with a fully self-contained automatic wheel-abrading machine, which strips racks to clean bare metal (an ideal surface for new powder coat) in minutes. The industry response has been overwhelming.

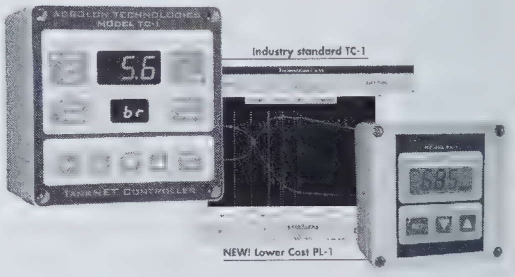
Topco will pick up old racks free of charge and refurbish, repair, and remanufacture them at a fraction of the price of a new rack. The new refurbishing process is economically and environmentally sound, making everyone a winner.

For more information, contact:
Topco, Inc.
Diana Ourston
974 Griffin St., Grover Beach, CA 93433
tel: 805/473-1535; fax: 805/473-1536
e-mail: topcomfg@aol.com
website: www.topcomfg.com

ACROLON TECHNOLOGIES, INC.

Acrolon is a leading supplier of Web-based cellar automation solutions. Its TankNET® system, introduced for harvest 2000, was the first of its kind. Since then, TankNET® has become a standard for Web-based temperature control and fermentation management.

In 2005, Acrolon introduced another industry first: **Power Line networking.** Available on the new PL-1 thermostat, Power Line networking allows TankNET® thermostats to communicate with a TankNET® Web server appliance over existing electrical wires in the cellar. Power Line networking dramatically lowers installation cost by eliminating tank-to-tank network cabling.



TankNET® features include:

1. Anytime/anywhere accessibility via web-browser,
2. Multi-user/Multi-level access control,
3. Automated heating and cooling,
4. Brix, temperature, and pump-over tracking by lot code,
5. Custom, animated cellar maps and reports,
6. Real-time data logging, trending, and archiving,
7. Instantaneous alarms via cell phones or e-mail.

Expansion options available with the TC-1 include:

1. Scheduled pump-overs and Brix monitoring,
2. Humidity and CO_2 management,
3. Stuck valve and level detection,
4. Strati-probe™ deep, multi-point temperature monitoring.

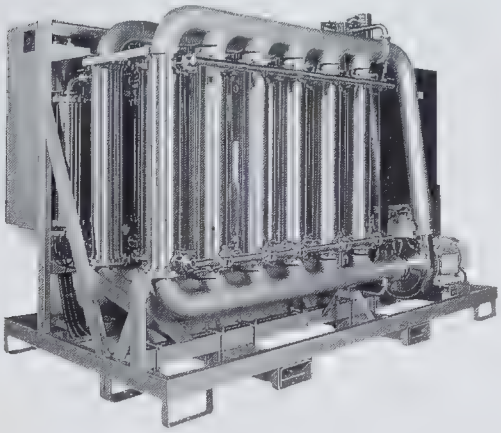
For more information, contact:
Acrolon Technologies, Inc.
19229 Sonoma Hwy., Sonoma,CA 95476
tel: 707/938-1300; fax: 707/938-1342
e-mail: info@acrolon.com
website: www.acrolon.com

PLEASE SEE ACROLON TECHNOLOGIES AD, PAGE 36.

GUSMER ENTERPRISES

Gusmer Enterprises' collaboration with Vaslin-Bucher offers the next generation of cross-flow filters to the U.S. wine industry. Vaslin-Bucher has engineered a fully automated cross-flow filtration system that will clarify wines and prepare them for sterile filtration, all in one-step.

The Vaslin-Bucher FM filter fully respects the quality of your wines! It utilizes a low filtration pressure (1.2 bar), kept at a constant level via a positive displacement feed pump, and operates with essentially no increase in temperature (5°F maximum). Back-pulse technology optimizes the flow rate, and there is no spent filter media to dispose of. The FM filter is easy to use and is capable of operating around the clock without direct operator supervision. There is an FM filter appropriately sized for all size wineries.



Evaluate a Vaslin-Bucher FM filter at your facility with the FM40 demonstration unit. This fully automated 40 square meter filter is trailer-mounted and can be brought to your winery for a production trial. Contact your Gusmer Enterprises representative for details.

For more information, please contact:
Gusmer Enterprises
Tim Ossun, Shadow Ostowari, Bill Merz, Ken Stewart, Dave Gusmer, Kathy Bollock, Rodger Pachelbel
81 M St., Fresno, CA 93721
tel: 559/485-2692; 559/485-4254
e-mail: sales@gusmerenterprises.com
website: www.gusmerenterprises.com

PLEASE SEE GUSMER ENTERPRISES AD, PAGE 30.

P&L SPECIALTIES

New product: Le Trieur™ (patent-pending) berry-sorter and MOG eliminator. Fifty new Le Trieur™ units were delivered in 2005, from New Zealand to Canada, Napa, Sonoma, and Lake counties, California Central Coast, and three Le Trieur™ in Oregon! A "Big-Boy" Le Trieur™, to process 10 to 12 tons/hour, is in development.

The P&L Specialties harvest lug washing machine quickly cleans-up pesky harvest lugs! A demonstration model is available to save energy, water, and labor.

New services: P&L Specialties offers complete crush pad and processing design services from concept to "as-builts," with free initial consultation.

P&L Specialties has designed some of the most modern and efficient crush-pads in the wine industry. P&L Specialties' design and engineering staff has the experience to show you the way, as a licensed California contractor, and can provide full service by working with architects and civil engineers. This vital, affordable service is for wineries of all sizes.

2005 crush-pad installations include: William Hill, Groth, Scheid, and Simi Winery. A press pad remodeling was completed at Clos du Bois. Three conveyors were installed at J Winery & Vineyards to deliver whole-cluster fruit to any of five presses (see photo page 96).

For best results and to control your costs, it is essential to begin design discussions early. Please call for an appointment. References readily available.

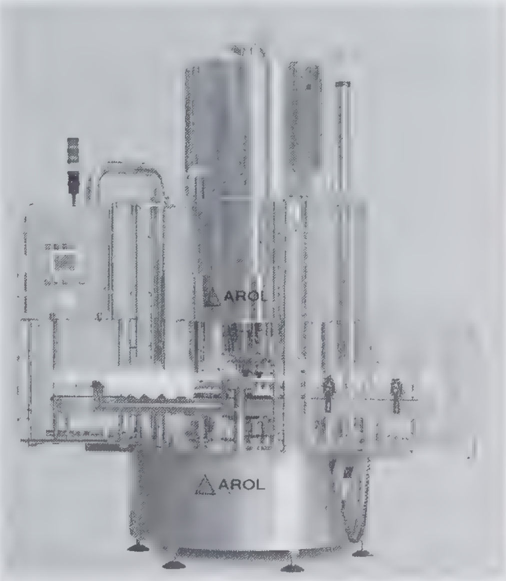
For more information, contact:
P&L Specialties
1650 Almar Parkway, Santa Rosa, CA 95403
tel: 707/573-3141 ext. 102
mobile: 707/849-8408
fax: 707/573-3140
e-mail: elbarr@sonic.net
website: www.pnlspecialties.com

PLEASE SEE P&L SPECIALTIES AD, PAGE 68.

AROL USA CLOSURE SYSTEMS

The servo-driven Equatorque is the newest Arol rotary capping machine. Equipped with ELAU's PacDrive SCL integral servo motor drive on each capping head, the Equatorque eliminates clutches to maximize flexibility and assure consistently accurate closing torque to any pre-threaded closure.

To assure quality, each capping head performs a torque self-calibration with every cycle. A sophisticated monitoring system detects closing faults automatically, including no cap, cap at incorrect angle, no container, and rotation of container. A simple operation sets optimum configuration of cap and container-closing torque. Adjustments can be made remotely while the machine is operating.



The Equatorque is available with one up to 30 servo-capping heads, each capable of a maximum production speed of 2,400 bottles per hour. All Equatorque rotary cappers use the same software application, providing a common look and feel for operators, programmers, and maintenance personnel.

For more information, contact:
AROL USA, Inc.
Division of Angelus Sanitary
Can Machine Co.
450 Satellite Blvd. NE, Ste. D
Suwanee, GA 30024
tel: 678/318-1290; fax: 678/318-1296
e-mail: salesusa@arol.com
website: www.arol.com

PLEASE SEE AROL USA AD, PAGE 20.

CRITICAL ENVIRONMENT TECHNOLOGIES

Carbon Dioxide detection is an important part of winery workplace safety. People die every year from exposure to high concentrations of CO_2.

Installing a CO_2 detection system to monitor the concentration of CO_2 in the fermentation area and automatically activate ventilation equipment is an effective way to ensure the area is safe and to ensure compliance with workplace safety regulations such as OSHA.

Critical
Environment
Technologies
GAS DETECTION

Carbon Dioxide exists normally in air at concentrations between 300 and 600 ppm. Exposure to moderately higher concentrations may produce headache, sleepiness, or dizziness. Prolonged exposure to high concentrations of CO_2 can be fatal. Carbon Dioxide is heavier than air and tends to accumulate near the floor. An injured person who has fallen to the floor could be exposed to dangerous levels of CO_2.

Critical Environment Technologies (CET) manufactures reliable, durable gas detection instruments for CO_2 and other gases including refrigerants, ammonia, carbon monoxide, SO_2, NO_2, chlorine, and many more. CET systems are very versatile and can be configured to suit any application, from smallest to largest.

For more information, contact:
Critical Environment Technologies
Bob Davidson
tel: 877-940-8741 (toll free)
e-mail: marketing@cetci.com
website: www.critical-environment.com

CRYOTECH / VBS INTERNATIONAL, INC.

Cryotech International, formerly VBS (a leader in liquid nitrogen delivery systems for container pressurization and/or oxygen displacement), helps wineries reduce headspace oxygen and extend shelf-life in screw cap packages while maintaining taste.

As the industry transitions to screw caps, winemakers are presented with new, unique challenges. Although screw caps eliminate the concern of "cork-taint," screw cap bottles have a greater headspace. Wine is exposed to oxygen trapped in the bottle headspace which, in turn, can result in increased dissolved oxygen levels, even after the cap is applied. Cryotech can help.

By introducing liquid nitrogen into the bottle after filling, winemakers reduce headspace O_2 content by more than 70%. Less headspace O_2 results in significantly lower dissolved O_2 pickup.

Cryotech has a complete line of liquid nitrogen dosing equipment to automate and control LN_2 injection. A very small dose of LN_2 is injected into filled bottles. One part of liquid nitrogen warms and turns into 700 parts of gas, displacing O_2 from the headspace.

After installing a Cryotech injection system, one winery reports dissolved oxygen content of less than 0.03 ppm without compromising the wine's fresh fruit taste.

For more information, contact:
Cryotech/VBS International, Inc.
745-B Camden Ave., Campbell, CA 95008
tel: 408/371-3303; fax: 408/371-3320
e-mail: salesinquiry@vbsflex.com

PLEASE SEE CRYOTECH/VBS INTERNATIONAL AD, PAGE 27.

WESTEC TANK & EQUIPMENT

Westec Tank & Equipment offers 100 to 350,000-gallon stainless steel tanks, fabricated by welders with years of experience in the manufacture of stainless steel products.

The VT self-contained wine tank will heat or cool wine all within one unit, runs off 220V power, can be configured in open-top, closed-top, floating top, or removable top. This versatile wine tank allows winemakers great flexibility to experiment on small batch wines.

THE BELLI CORPORATION
WESTEC
TANK & EQUIPMENT, CO.

In 2004, the OX-BOX (a micro-oxygenation process) was introduced. This micro-oxygenation process occurs in stainless steel instead of oak barrels. When combined with the VT wine tank, two pieces of equipment become just one.

The Belli Corporation provides stainless steel tanks for many uses, catwalks, sump carts, and many more specialty items fabricated to the specifications of each winemaker.

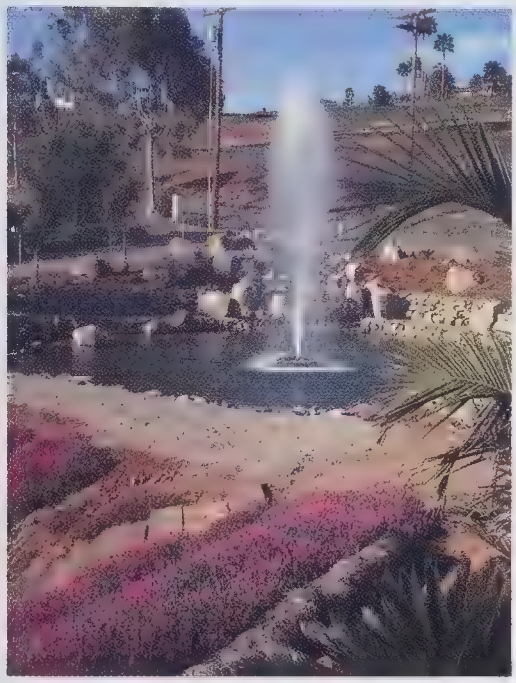
For more information, contact:
Westec Tank & Equipment
Joe Belli, Jim Belli, Mark McDowell
PO Box 338, 1402 Grove St.
Healdsburg, CA 95448
tel: 707/431-9342; fax: 707/431-8809

PLEASE SEE WESTEC AD, PAGE 52.

KASCO MARINE, INC.

Kasco Marine has been in business for over 35 years supplying pond aerators, de-icers, and fountains for water quality improvement and aesthetic reasons.

All products are designed for fresh or saltwater, to ship via UPS, and ETL-approved UL and CSA safety standards, and come with a two-year warranty.



The initial purchase price and operational costs are the lowest of any major manufacturer. Kasco Marine's units are affordable, dependable, efficient, and can help with algae control, odors, and general overall health of your pond.

For more information, contact:

Kasco Marine, Inc.
800 Deere Rd., Prescott, WI 54021
tel: 715/262-4488; fax: 715/262-4487
e-mail: sales@kascomarine.com
webite: www.kascomarine.com

PLEASE SEE KASCO MARINE AD, PAGE 60.

REFRIGERATION TECHNOLOGY, INC.

Refrigeration Technology, Inc. (RTI) builds portable glycol chillers with optional heating in three sizes (2hp, 3hp, and 5hp) for small wineries.

RTI Construction is a new division that sells and installs STAR™ metal buildings for production and storage.

RTI has a 20,000 sq.ft. facility in Middletown, CA, which is the company's world headquarters. 7,200 sq. ft. have been bonded for temperature-controlled, case-goods wine storage (competitively priced), ideal for long-term storage of small lots. The warehouse is designed to maintain 58° to 60°F year-round and is equipped with temperature and security alarms.

The cost of RTI's SUPER STAT control systems has been reduced. They are now PC-compatible and feature new graph- and data-download options. RTI can put customer's control systems on the web for worldwide access by authorized personnel.

For more information, contact:

Refrigeration Technology, Inc.
18815 S. Hwy. 29, PO Box 368
Middletown, CA 95461
tel: 800/834-2232 (toll free) or 707/987-0500
fax: 707/987-4581
e-mail: sales@rti2000.com
website: www.rti2000.com

PLEASE SEE RTI AD, PAGE 72.

VINOVATION, INC.

Vinovation continually develops news tools and refines "GrapeCraft" techniques to serve clients' diverse artistic needs and practical realities. Building on a decade of success in custom equipment design, Vinovation announces a new alliance with Australia's leading wine production consulting firm, Wine Network Australia, to create MEMSTAR, a global brand of innovative wine production equipment employing an international design team tailoring solutions to local market requirements on six continents.

m memstar

The principle of MEMbrane Separation, Treatment, and Recombination is in each product line. **MEMSTAR RO** (Reverse Osmosis) uncouples harvest from brix thru applications removing rainwater, adjusting alcohol, and reducing volatile acidity. **MEMSTAR UF** (ultrafiltration) enhances skin extraction, phenolic structure, and flavor retention and integration. **MEMSTAR ED** provides rapid, reliable tartrate stabilization at room temperature preserving wine structure and saving 90% of energy costs. Australia's latest innovation is **MEMSTAR AA**, a mobile membrane dealcoholization system that, when coupled with MEMSTAR RO on a licensed DSP, provides same-day finished alcohol adjustment on-site for all lot sizes.

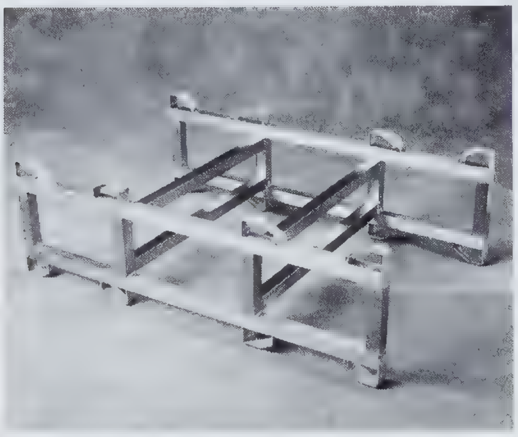
MEMSTAR applications are available for service, rental, lease, and purchase. Vinovation's seasoned professionals identify solutions to your needs and facilitate their access.

For more information, contact:

Vinovation, Inc.
1446 Industrial Ave., Sebastopol, CA 95472
tel: 707/824-7900; fax: 707/824-7905
e-mail: info@vinovation.com
website: www.vinovation.com

G.W. KENT, INC.

G.W. Kent, Inc. supplies a full line of tanks, winery processing equipment, stainless steel barrel racks, fittings, and valves.



G.W. Kent stainless steel barrel racks have replaced many rusty metal barrel racks in wineries all over the U.S.. In conjunction with offering stainless steel barrel racks that out-shine competition, G.W. Kent also offers competitive prices and quick delivery from stock or custom production. By reducing labor and maintenance costs, stainless steel barrel racks are an investment that pays for itself in less than three years.

For more information, please contact:
G.W. Kent, Inc.
3667 Morgan Rd., Ann Harbor, MI 48108
tel: 800/333-4288, or 734/572-1300
e-mail: info@gwkent.com
website: www.gwkent.com

PLEASE SEE G.W. KENT AD, PAGE 13.

COLLOPACK SOLUTIONS

ColloPack Solutions provides to the U. S. wine industry premier lines of processing and bottling equipment. ColloPack's comprehensive range of products offers solutions for virtually every major step in wine production from grape receiving to bottling and case packing. Manufacturers ColloPack represents include:

COLLOPACK
SOLUTIONS LLC

1. **Diemme** — membrane, screw and basket presses; destemmer/crushers; grape sorting and conveying lines; plate and frame lees filters.
2. **Bertolaso** — integrated bottling lines including low vacuum, gravity, and counter pressure fillers; corkers; cappers for ROPP, crown and plastic closures; bottle cleaners; micro filtration systems; bottle conveyors and line automation.
3. **Robino & Galandrino** — capsule dispensers; thermal heat shrink capsule applicators for PVC; capsule spinners for composite and tin; wirehood and champagne capsule applicators.
4. **Cavagnino & Gatti** — rotary wet glue, pressure-sensitive labelers.
5. **Cames** — bottle washing; cork orientors.
6. **Berchi** — bottle and carton depalletizers; carton conveyors and palletizers; case packers.
7. **Perrier** — sparkling wine disgorging machinery.
8. **Champagel** — sparkling wine freezing of yeast solids.
9. **Francisco Oller** — sparkling and still wine agglomerated closures.
10. **Tersainox** — stainless steel tanks and drains.

ColloPack provides comprehensive after-sales service and support including a local inventory of over 5,000 different parts and a team of experienced, trained technicians for installation, start-up, and post-sales service.

For more information, contact:
ColloPack Solutions, LLC
Dave Means, Phil Giacalone, Joe Mironicki, Rick White, Mike Wlodarczyk, Lisa Doud, Greg Fulford
193 Camino Dorado, Napa, CA 94558
tel: 707/258-3940; fax: 707/258-3949
e-mail: sales@collopack.com

PLEASE SEE COLLOPACK SOLUTIONS AD, PAGE 31.

ELECTRO-STEAM GENERATOR CORP.

Electro-Steam Generator Corp. has manufactured all-electric steam generators since 1952.

The generators operate at 98% efficiency and produce culinary-grade steam. They are designed for point-of-use placement or with portable mounting. Some of the many uses include: sterilizing bottling lines, melting tartrates, refurbishing barrels, and general cleaning.

Because there is no open flame, Electro-Steam generators are safe to operate resulting in lower insurance costs.

Basic maintenance will extend the life of an Electro-Steam unit by many years.

Each generator is hand-built to meet your requirements. The units are manufactured under the ASME Code, are national board of PVI shop-inspected, and UL- and ETL-certified. CSA certification is provided upon request.

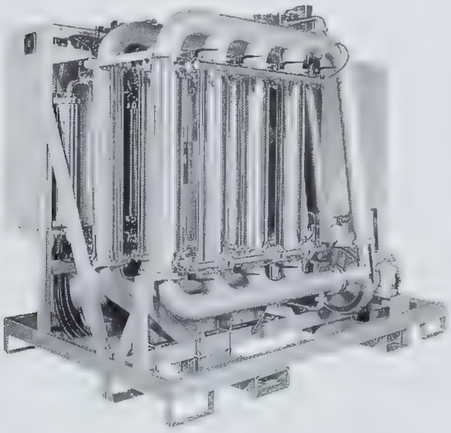
For more information, contact:
Electro-Steam Generator Corp.
7217 Lockport Pl., Ste. 207
Lorton, VA 22079
tel: 800/634-8177; fax: 888/783-2624
e-mail: jharlin@electrosteam.com
website: www.electrosteam.com

CUNO, INC.

CUNO is a world leader in the design and manufacture of filtration products and systems for the separation, clarification, and final filtration of fine wines.

The long list of CUNO innovations for wine filtration includes the first non-asbestos filter sheet (Zeta Plus®), the first dual zone clarification depth filter (Zeta Plus® Maximizer™), the first nylon membrane optimized for repetitive hot water exposure (BevASSURE® II), and the first integral multi-zone membrane prefilter (LifeASSURE®).

CUNO recently added two new products. BevASSURE® PES, a new, polyether sulfone membrane-based final filter, that combines three new technologies from CUNO to improve filter throughput and reduce operating costs. A highly asymmetric microporous membrane, a patented pleating design, and a novel, patent-pending support layer construction, work in concert to deliver ultra-fast flow rates, secure spoilage organism retention, and remarkable throughput.



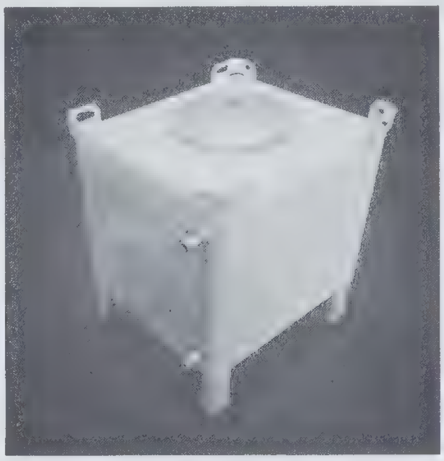
CUNO has also introduced the new CUNO Flex™ cross-flow filtration plant to winemakers around the world. This totally automated, user-friendly equipment takes the hassle out of primary filtration and clarification.

With over 90 years of experience and manufacturing facilities on five continents, CUNO is suited to provide solutions to wineries worldwide.

For more information, contact:
CUNO, Inc. (a 3M company)
400 Research Parkway, Meriden, CT 06450
tel: 800/243-6894; fax: 203/630-4530
e-mail: cjohara@mmm.com
website: www.cuno.com

HOOVER MATERIAL HANDLING GROUP, INC.

Hoover Materials Handling Group, Inc. has the answer for your wine storage during peak production times. Stainless steel Wine Totes™ are manufactured in an ISO 9001:9002 facility to meet the high-quality standards of the wine industry. Tanks are ideal for fermenting Sauvignon Blanc and other white wines, or for temporary storage of red wine.



Hoover has been manufacturing containers since 1949, and has withstood the test of time.

Tank sizes available are 180, 250, 350, 450, or 550 gallons.

The wine tank features:

- 304 stainless steel (10-gauge) construction,
- 22½-inch top opening,
- 2-inch sanitary 90° elbow in tank bottom for discharge.

Numerous options are available, including a 304 stainless steel (14-gauge) heating and cooling transfer surface.

Hoover Materials Handling Group also offers the Endural grape box, which is excellent for grape picking. This FDA-approved, natural HDPE container is easy to handle, durable, re-usable, and features an easy to clean, smooth surface.

For more information, contact:
Hoover Materials Handling Group, Inc.
8801 Wallisville Rd., Ste. A
Houston, TX 77029
tel: 800/844-8683; fax: 713/678-7077
website: www.HooverSolutions.com

PLEASE SEE HOOVER MATERIALS HANDLING GROUP AD, PAGE 124.

KLR MACHINES, INC.

KLR Machines, the sole U.S. distributor for Bucher presses and Delta destemmers, also offers the Vaslin-Bucher JLB basket press complete with automatic programming and the latest PLC technology.

KLR's complete line of Vaslin-Bucher equipment is developed by expert factory technicians, designed to work in-line from grape reception through processing, saving you from the costly exercise of custom engineering and design.

The Bucher line of presses and reception equipment come in various capacities to accommodate small-, mid-, and large-size wineries alike. To obtain more information about Vaslin-Bucher lines of equipment and other KLR products, visit the KLR website.

For more information, contact:
KLR Machines, Inc.
350 Morris St., Ste. E, Sebastopol, CA 95472
tel: 707/823-2883; fax: 707/823-6954
47 W. Steuben St., Bath, NY 14810
tel: 607/776-4193; fax: 607/776-9044
e-mail: klrmach@pacbell.net
website: www.klrmachines.com

PLEASE SEE KLR MACHINES AD, PAGE 33.

St. Patrick's of Texas

St. Patrick's supplies equipment for small to mid-size wineries from three warehouses covering 25,000 s.f. in Austin, TX. Product descriptions and pricing are available online at www.stpats.com. Equipment manuals are also available online.

St.Patrick's of Texas

St. Patrick's of Texas stocks the following equipment:

1. Electric corkers with vacuum/gas,
2. Pneumatic corkers,
3. Monoblocs (filling and corking),
4. Semi-automatic labelers,
5. Enoitalia crusher/destemmers,
6. Wine tanks,
7. Hydraulic, water, and ratchet presses,
8. French oak barrels,
9. Barrel accessories,
10. Pumps,
11. Stainless steel valves and fittings,
12. Wine hose and clamps,
13. Refractometers, hydrometers, pH meters,
14. Heat shrink and foil applicators,
15. Norcor corks,
16. Rotary vacuum, lees, plate, and cartridge filters,
17. Filter sheets and media,
18. Filling machines.

For more information, contact:
St. Patrick's of Texas
1828 Fleischer Dr., Austin, TX 78728
tel: 512/989-9727; fax: 512/989-8982
e-mail: stpats@bga.com
website: www.stpats.com

PLEASE SEE ST. PATRICK'S AD, PAGE 61.

JV Northwest, inc.

The Convertible Fermentor (360-day use) was redesigned for the 2005 crush. The defining feature of the Convertible Fermentor has always been its oversized top manway. The sealable, removable door hatch concept remains almost unchanged, but the tank-to-lid connection has been improved.

The new design completely eliminates the top edge, or "shoulder," of the tank. The top of the tank is now a cleaner design and the lid is easier to manipulate. The 2-point wing nut attachment (consistent and equal pressure) has not been altered.

The airtight top is now a completely removable lid with a gasketed top edge. The lid has a slight dome that lends strength with no-puddles. Tank sidewalls are clean and straight. Cooling jackets, zoned or sectioned, are built for multi-level temperature control. Drain screens are optional.

The flat sloping bottom is available with stainless legs, mild steel base or bench mount (concrete pedestal).

The ability to transform this tank from an open top fermentor with full access to the cap into an air-tight fermentor makes this tank uniquely adaptable and provides year-round use.

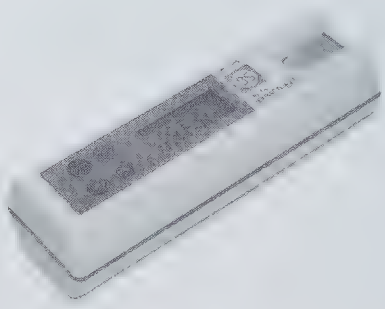
- Flat edge clean-out manway for easy pomace removal,
- Inswing-outswing racking door,
- Temperature well (braced),
- Racking port,
- Optional sump style drain,
- Chart holder,
- Adjustable stainless steel feet.

For more information, contact:
JV Northwest, Inc.
390 S. Redwood St., Canby, OR 97013
tel: 800/331-5869 or 503/263-2858; fax: 503/263-2868 or 503/263-1829 (Engineering)
email: tanks@jvnw.com or parts@jvnw.com
website: www.jvnw.com

Bellingham + Stanley, inc.

Bellingham + Stanley offer a wide range of refractometers for use in the wine, fruit, and beverage industries. The portable Eclipse and DR handheld range of refractometers can achieve a wide variety of °Brix, probable alcohol, Oechsle, KMW (Babo), and many other scales for "on-the-spot" measurements in the field or laboratory, to the RFM700, RFM800, and RFM300 automatic digital bench ranges for higher accuracy across extended °Brix ranges. Taking the concentration °Brix reading of grapes to monitor ripeness could not be easier.

Bellingham + Stanley is situated near Atlanta, GA, and offers full sales and service of their high quality products and technical expertise in back up and support. Bellingham + Stanley's facility can assist with loaners and demonstration models so you can maintain your production and harvest without loosing out on the valuable results desired when your unit needs to be serviced or you are looking to upgrade.



Fully comprehensive literature, information, and pricing details are available by contacting Bellingham + Stanley by phone, fax, or e-mail.

For more information, contact:
Bellingham + Stanley, Inc.
1000 Hurricane Shoals Rd., Bldg. D, Ste. 300
Lawrenceville, GA 30043
tel: 800/678-8573; fax: 770/822-9165
e-mail: techsales@bs-rfm-inc.com
website: www.bellinghamandstanley.com

PLEASE SEE BELLINGHAM + STANLEY AD, PAGE 76.

PICKERING WINERY SUPPLY

Pickering Winery Supply has been selected by Rod Ferronato, president of Santa Rosa Stainless Steel (SRSS), as sales agent beginning January 2006. Santa Rosa Stainless Steel is a leader in stainless steel tank fabrication since 1968. Over 10,000 tanks from 1 to 400,000 gallons have been delivered in more than 30 years to over 800 wineries and breweries.

Aside from the excellence of design and the quality of the welding, what most distinguishes SRSS is an unquestioned reputation for on-time delivery. No project is undertaken without a thorough study of the time constraints for completion of any job. Exceptional quality at competitive prices, combined with unparalleled service, enables Santa Rosa Stainless Steel to maintain its position of leadership.

W.E. Ware & Co located in Adelaide, Australia, has been making products for the wine industry since 1927. W.E. Ware specializes in stainless steel winery equipment including fittings, mixers, barrel washers, sulfphitometers, and valves. One can also find barrel-racking spears, red fermentor irrigators, curved barrel stirrers, and gravity bottle filling machines. Visit the website: www.weware.com.au.

For more information, contact:
Pickering Winery Supply
888 Post St., San Francisco, CA 94109
tel: 415/474-1588; fax: 415/474-1617
e-mail: pickering@sbcglobal.net
website: www.winerystuff.com

PLEASE SEE PICKERING WINERY SUPPLY AD, PAGE 85.

INOXPA USA, INC.

Since 1973, Inoxpa has provided an essential contribution to wine production throughout the world. Inoxpa has created a technologically advanced range of pumps with a high degree of specialization and has applied its technical solutions to the specific challenges of the wine industry.

INOXPA
SOURCE OF SOLUTIONS

Inoxpa's product line includes:

- Must pumps (NTE): Progressive cavity pump in five different sizes, from 8 t/h up to 75 t/h.
- Lobe pumps (SLR): A versatile pump that can be used in wine transfer, filtration, or bottling. Sizes: from 1.5-inch to 6-inch clamp fittings.
- Flexible Impeller pumps (RF): Variable speed, reversible, self-priming pumps come with 1-inch up to 3-inch outlets that are suitable for juice, wine, or lees transfer.
- Progressive Cavity pump (KSF): Very gentle and versatile, becoming very common as portable pumps for transfers, filtration, and bottling.
- Peristaltic pump (PVT): Widely used in a winery from must to transferring wine — most gentle on wine.
- Centrifugal pumps: For wine transfers, very time-efficient pump.
- Helicoidal Rotor Pump (RV): Specifically designed for pump overs.
- Portable tank mixers (CPG).
- Valves and fittings: butterfly, ball, pinch valve.

For more information, contact:
Inoxpa USA, Inc.
Terry Dewane
3715 Santa Rosa Ave., Suite A4
Santa Rosa, CA 95407
tel: 707/585-3900; fax: 707/585-3908
e-mail: tdewane.us@inoxpa.com

PLEASE SEE INOXPA USA AD, PAGE 61.

ARS/PRESSURE WASHER CO.

For barrel and barrel-room management, ARS/Pressure Washer Company (ARS/PWC) provides choices. The original Bitard Bordeaux barrel rinser is exclusively imported by ARS/PWC. Steam is one of the most effective ways to remove tartrates and sanitize barrels. ARS/Electro-Steam has led the way in providing efficient, portable steam generators that are used to sterilize or sanitize bottling lines, tanks, and facilities. The ARS/PWC Bordeaux-Style Barrel Steam Wand is the perfect appliance for safely introducing steam to a barrel.

PRESSURE
WASHER
COMPANY
ars We work well under pressure.

For high-pressure barrel washing, ARS/PWC offers the Moog bunghole-up barrel washing appliances and Hydro Tek pressure washers. This combination is reliable and affordable. Moog offers three models including the exclusive Flex model for washing pyramid-stacked barrels. Hydro Tek also offers an effective and efficient concrete floor washer.

For maintaining humidity in the barrel room, ARS/PWC offers systems for small wineries and large warehouse facilities. The Fogmaster line also includes specialized foggers for spraying chemicals.

Miele Professional high-quality dish and glassware washers combine whisper-quiet operation and meet NSF requirements for sanitization. Units feature two layers with a variety of tray inserts. Miele service is available nationwide.

Showroom is open by appointment. Call ARS/PWC and see that, "We work well under pressure."

For more information, contact:
ARS/Pressure Washer Company
1184 Maple Ln., Calistoga, CA 94515
tel: 707/942-8330; fax: 707/942-8337
e-mail: info@arsenterprises.com;
website: www.cleanwinery.com

PLEASE SEE ARS AD, PAGE 84.

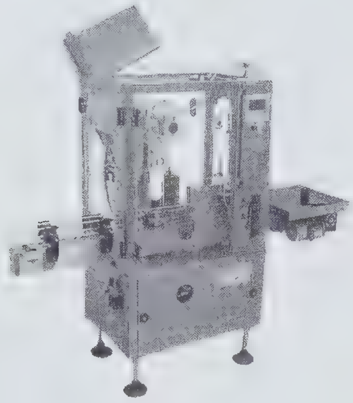
CRIVELLER COMPANY

Criveller Company has supplied the wine and beverage industries for over 25 years! Criveller's Windsor, CA, office is in place to expedite customer service for wineries in California, Oregon, and surrounding western states.

Criveller carries a wide variety of processing equipment for every winemaking phase and fabricates stainless steel tanks to customer specifications. Red wine fermentors with a mobile plunger are available.

In conjunction with leading manufacturers of bottling and labeling equipment, Criveller offers manual, semi-automatic, or fully automatic bottling lines, including cost-effective monoblocs and triblocs that cater to all bottling needs.

Criveller's warehouses in Niagara Falls, Canada, and Windsor, CA, stock various models of bottling equipment, filters, destemmer/crushers, presses, and stainless steel tanks, including variable capacity and mini-tanks, for customer inspection.



For more information, contact:
Criveller Company
West Coast: Criveller California Corp.
Bruno Criveller or **Kimberly Rickman**
10350 Old Redwood Hwy.
Windsor, CA 95472
tel: 707/838-2222; fax: 707/838-2242
e-mail: crivca@sonic.net
Canada
Bruno or **Mario Criveller**
6935 Oakwood Dr.
Niagara Falls, Ontario L2E 6S5
tel: 905/357-2930; fax: 905/374-2930
e-mail: info@criveller.com
East Coast
PMB 202
1623 Military Rd.
Niagara Falls, NY 14304-1745
tel: 905/358-5202

PLEASE SEE CRIVELLER COMPANY AD, PAGE 120.

TOYOTA MATERIAL HANDLING

The American-Lincoln SR5730 cylindrical Compact Scrubber offers productivity and maneuverability through a variety of choices that customize it to your specific needs, whether it is in the 34-inch or 38-inch disc or 34-inch cylindrical scrub path, with battery packages, or productivity-enhancing options.

1. Modulated brake system for increased operator safety,
2. Operating system with self diagnostics for easier maintenance,
3. "SpeedSense" increases cleaning productivity,
4. Patented break-away squeegee protects your investment,
5. Brushes and solution off-in-neutral simplifies operation.

For more information, contact:
Toyota Material Handling
North America
Mark Andres, VP of sales
tel: 510/675-0500
e-mail: mandres@tmhnc.com
website: www.tmhnc.com

PLEASE SEE TOYOTA MATERIAL HANDLING AD, PAGE 69.

KEY TECHNOLOGY, INC.

Key Technology, a leading supplier of processing equipment for over 50 years, introduces a new Wine Grape Inspection Shaker. This gentle, continuous-flow, maintenance-free vibratory conveyor presents grapes at an ideal speed to spot and remove undesirable fruit and MOG from grapes. The Wine Grape Inspection Shaker allows winemakers to achieve efficient quality control, providing flawless berries with no leaves, bugs, raisined clusters, or Material Other than Grapes (MOG).

"We love the fact that Key's Inspection Shaker is easy to clean," states John Giannini, winemaker at California State University, Fresno, which operates a full production winery within a teaching environment. "We're sticklers for sanitation. If equipment is difficult to clean, the possibility of microbial growth is greater and that can have an impact on wine quality."

Key's Wine Grape Inspection Shaker features an adjustable speed control that allows the standard shaker to handle from zero to five tons of product per hour; larger shakers with a capacity of up to ten tons per hour are available.

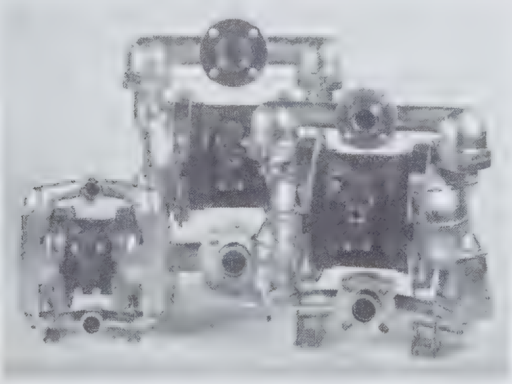
Key Technology also offers: an Impulse™ Electromagnetic Conveyor, Belt Conveyor, Bin Dumper, and 2X Air Cleaner to help wineries enhance product quality and improve production efficiencies.

For more information, contact:
Key Technology, Inc.
150 Avery St., Walla Walla, WA 99362
tel: 509/529-2161; fax: 509/527-1331
email: info@key.net
website: www.key.net

POWER INDUSTRIES

Power Industries offers a new line of air-operated diaphragm pumps ideal for winery applications.

All-Flo diaphragm pumps offer a unique, patented, lube-free air valve system designed to eliminate product oil contamination and provide hassle-free operation. The air valve design prevents stalling at low speeds. The superior design of the All-Flo pump, and the use of thermoplastic materials helps provide users with the best possible cycle life in the marketplace.



All-Flo pumps are designed with serviceability in mind. Fewer parts and less down time keep maintenance costs low. All-Flo pumps come with a five-year warranty on defects in materials and workmanship.

For more information, contact:
Power Industries
520 Barham Ave., Santa Rosa, CA 95404
tel: 707/545-7904; fax 707/541-2211
e-mail: sales@powerindustries.com
website: www.powerindustries.com
926 Kaiser Rd., Napa, CA 94558
tel: 707/252-7333; fax 707/257-8547

PLEASE SEE POWER INDUSTRIES AD, PAGE 16.

AAQUATOOLS, INC.

AaquaTools, Inc. (formerly Industrial Cleaning Systems) has provided water-driven cleaning tools to the wine industry for over 20 years. AaquaTools' success is a result of an ability to fill sanitation voids with high pressure, low-flow, specialty cleaning tools that clean quickly while requiring minimal amounts of water.

AaquaTools, Inc.

AaquaTools' AaquaBlaster series of self-propelled cleaning tools can be used for either barrel or tank washing. Robust and reliable, the AaquaBlaster successfully cleans with hot water (up to 185°F) and high impingement, with minimal amounts of wash fluid.

AaquaTools HotCart portable propane-fired hot water generator/high pressure washer, provides hot water (up to 180°F) for domestic or high-pressure applications. Fired by clean-burning, energy-efficient, "tankless technology" and, coupled with a KEW Poseidon pump and motor assembly, AaquaTools Hot Carts make dirty, odorous, diesel-fired pressure washers a thing of the past.

The KEW Poseidon is a perfect driver for all water-driven tools. Designed as a cold water electric pressure washer, the Poseidon receives hot water up to 185° while delivering up to 2,750 psi @ 5.5 gpm.

AaquaTools offers ozone and steam generators, water-driven floor cleaning attachments, and many more effective cleaning tools.

For more information, contact:
AaquaTools, Inc.
PO Box 3119, Diamond Springs, CA 95619
toll free: 800/777-2922; fax: 916/635-8856
e-mail: info@AaquaTools.com
website: www.AaquaTools.com

PLEASE SEE AAQUATOOLS AD, PAGE 53.

SEEPEX, INC.

seepex, Inc. offers a variety of pumps for the wine and juice processing industries. Open hopper pumps can be fabricated with hoppers made to the user's dimensional requirements and can be fitted on carts for portability and ease of cleaning. Pumps are available with complete control packages and options such as TSE run-dry protection and a retensioning device to adjust the stator for wear.

seepex

seepex BT pumps have a unique induction system that ensures positive berry and must feed into the pumping elements, with capacities to 1,300 GPM. This improves efficiency, lowers operating speeds for longer component life, and reduces fruit damage caused bu too much recirculation.

Gentle handling of the fruit is especially important for winemakers where it is desirable to ferment the entire grape rather than only the juice. Degradation of skins from rough product handling may result in extra chemicals being released during fermentation, giving undesirable characteristics to the end wine.

Pumps can be constructed to meet FDA requirements.

Pumps and parts are stocked in the **seepex** warehouse and by **seepex** distributors.

For more information, contact:
seepex, Inc.
511 Speedway Dr., Enon, OH 45323
tel: 937/864-7150, ext. 117
e-mail: sales@seepex.net
website: www.seepex.com

PLEASE SEE SEEPEX AD, PAGE 57.

RAYNOX 2000, INC.

Raynox 2000, Inc. is a manufacturer of high-quality stainless steel tanks and equipment for the wine industry.

With high standards for fabrication, welding, and polishing, Raynox tanks are made to customer's specifications. Should you require variable capacity tanks, closed top tanks with or without cooling jackets, or rectangular tanks to maximize winemaking space, Raynox supplies best quality at competitive prices. Raynox's manufacturing facility includes equipment that produces Euro finishes.

Through the years, Raynox has expanded beyond tank fabrication and now also produces winemaking equipment. Plate and frame filters, cartridge filter housings, pneumatic membrane presses, gravity bottle fillers, must pumps, and other ancillary are all part of Raynox's standard product line. To complete the selection, Raynox carries a wide range of accessories such as valves, tri-clamp fittings, and seals.

Raynox tanks are sold throughout the mid-west and east coast of the U.S. and in the Niagara region and southern area of Ontario, Canada, the province of Quebec, and the Canadian west coast.

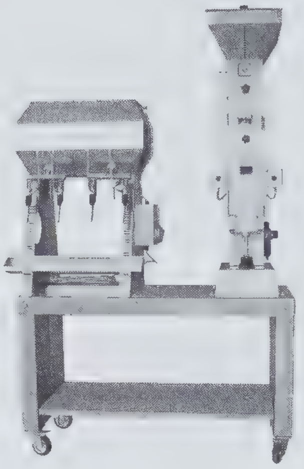
For more information, contact:
Raynox 2000, Inc.
Sales Department
1148 St. Michel, St. Cesaire
Quebec, Canada J0L 1T0
tel: 866/469-4181 (toll free)
fax: 450/469-2112
e-mail: raynox@raynoxinc.com
website: www.raynoxinc.com

PLEASE SEE RAYNOX AD, PAGE 28.

NAPA FERMENTATION SUPPLIES

Napa Fermentation Supplies offers a full line of winemaking equipment and supplies, including stainless steel tanks in variable capacity with adjustable lids from 26 gallons to 2,693 gallons and closed-top tanks from 79 gallons to 5,221 gallons, with or without manway and with or without cooling.

Also available are: Karcher hot water pressure washers with 1,300 psi to 3,000 psi and temperatures from 86°F to 285°F steam; one-inch and 1.5-inch Jabsco pumps with AC inverter drive; two-inch or three-inch Zambelli must pumps with AC inverter drive; Zambelli crusher/destemmers from two to 14 tons per hour; Zambelli manual and hydraulic, membrane, and bladder presses; eight-inch and 16-inch Zambelli plate filters; a full line of stainless steel fittings and valves, butterfly and ball; one-inch to four-inch wine hose; labware; refractometers; wine thieves; and table-top labelers.



Napa Fermentation also offers the "Tivoli" portable filling/corking machines with an hourly production rate of 500 to 600 liters per hour. The machine is pneumatic, with or without vacuum, manufactured in AISI 302 stainless, and only weighs 72 KG. The Tivoli takes 22mm, 24mm, 26mm natural or synthetic corks, and can be fitted for 28mm on request. Napa Fermentation also offers a full spectrum of foil spinners.

For more information, contact:
Napa Fermentation Supplies
575 Third St., Bldg. A, Napa, CA 94559
tel: 707/255-6372; fax: 707/255-6462

PLEASE SEE NAPA FERMENTATION AD, PAGE 53.

SKOLNIK INDUSTRIES, INC.

Skolnik stainless steel cooperage is designed to meet the special needs of winemakers in all stages of fermentation, maturation, and storage of fine wines. Skolnik has a long and proud tradition of providing leading winemakers with stainless steel drums of high quality, durability, and design.

SKOLNIK INDUSTRIES, INC.
MANUFACTURERS OF STAINLESS STEEL BARRELS

Skolnik's wine industry customers look to stainless steel cooperage to supplement oak barrels in key stages of the winemaking process. Stainless steel offers unique and unsurpassed qualities for preserving product integrity and purity — important considerations for why stainless is a key tool for winemakers.

Stainless steel cooperage is:

1. Versatile and adaptable to many uses,
2. Ready for use after being sterilized,
3. Cost-effective and long-lasting,
4. Predictable, reusable, and easy-to-clean,
5. Virtually maintenance-free,
6. Available in sizes from 5 to 55 gallons.

Skolnik is a full-service manufacturer of steel containers and accessories. Every Skolnik container is thicker, heavier, and stronger than industry standards — a commitment made to customers for more than 75 years.

For more information, contact:
Skolnik Industries, Inc.
Jason Snow
4900 S. Kilbourn Ave., Chicago, IL 60632
tel: 800/441-8780; fax: 773/735-7257
e-mail: jason@skolnik.com
website: www.skolnik.com

PLEASE SEE SKOLNIK INDUSTRIES AD, PAGE 64.

PULSAIR SYSTEMS, INC.

Pulsair is an innovative company that has brought a new technology to winemaking called Pneumatage — a new method for making wine! Pneumatage is changing the way people think about drinking wine, buying wine, and storing wine. Pneumatage makes better wine faster that is more drinkable sooner and therefore, no matter the arguments, better for the bottom line. Moreover, Pneumatage can be automated. It takes over where other systems are just starting.

Pneumatage automates the fermentation cycle leaving the winemaker to do what they do best — make wine. The winemaker is now free to test, examine, evaluate, and taste the wine during fermentation and not worry about the daily chores of turnovers, labor management, and paperwork and, when the wine is finished, the data can be downloaded for future use.

The Pulsair hand-held PTM-2002W allows small wineries to turn the cap from the top or through the racking port. The portable Wine Cart expands the ability of the PTM to mix larger tanks in a semi-automatic mode. Pneumatage Light allows programming of a fermentation cycle. The fully programmable Pneumatage System will turn multiple tanks on a predetermined time schedule for 14 days. More than 100 tanks can be operated from one central controller. When you're through, any Pulsair system can be used to quickly mix and blend to create a great Estate Vintage.

For more information, contact:
Pulsair Systems, Inc.
tel: 425/455-1263, or toll free: 800/582-7797
e-mail: sales @pulsair.com

PLEASE SEE PULSAIR SYSTEMS AD, PAGE 45.

PAUL MUELLER COMPANY

Established in 1940, Paul Mueller Company is a leading manufacturer of high-quality stainless steel tanks and processing equipment that make the customer's process smoother, faster, and more reliable.

Mueller has the technical expertise, innovative engineering, and manufacturing resources to implement a process system specific to your needs. Mueller's philosophy is simple: They are committed to meeting and exceeding customers' expectations of value by providing quality equipment and excellent service.

MUELLER
PROCESSING SYSTEMS AND EQUIPMENT

Mueller has more than 950,000 square feet of manufacturing space in two facilities located in Springfield, Missouri, and Osceola, Iowa. Mueller products are used in over 100 countries worldwide.

Field fabrication, erection, and installation services are provided by Mueller Field Operations, Inc., a wholly owned subsidiary. Transportation is handled by another wholly owned subsidiary, Mueller Transportation, Inc.

For more information, contact:
Paul Mueller Company
PO Box 828, 1600 West Phelps
Springfield, MO 65801
tel: 800/MUELLER (toll free)
website: www.muel.com

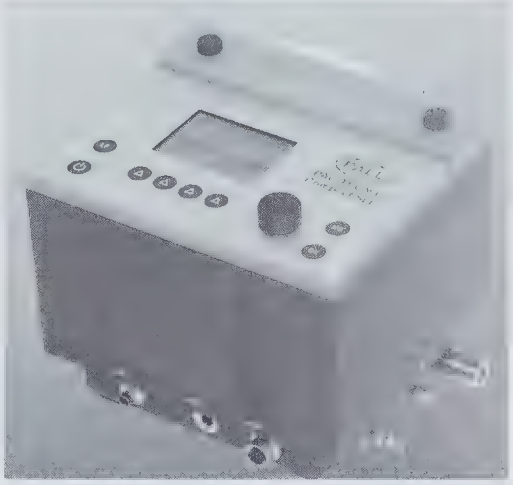
PLEASE SEE PAUL MUELLER CO. AD, PAGE 49.

PALL CORPORATION

The integrity of a final filter is critical for the control of microbial contamination in wine. The Palltronic® Compact Star integrity test device provides an accurate confirmation of the filter's integrity in situ. It performs a complete and reliable pressure-hold test to determine the integrity of a filter by measuring pressure decay over a period of time.

Compact Star test unit holds true to its name — it is small, lightweight, and portable. Yet, it can even be used to perform integrity testing on very large installations.

Although inexpensive, this test device offers a full range of convenient features and is completely automated, eliminating the variability of results that can occur with manual tests.



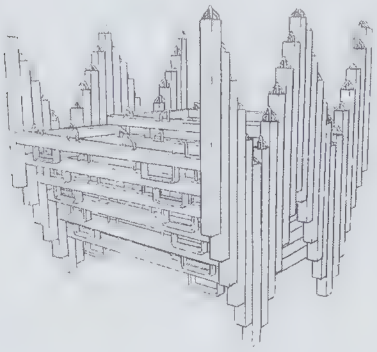
Test results are displayed in a large window at the top of the unit, automatically saved in memory, and printable for use in process documentation. Test programs can either be created or retrieved from memory. Up to 250 test programs and 1,000 test results can be stored or downloaded to a PC. In addition, language and units of measure can be selected for each test.

For more information, contact:
Pall Corporation
Nicole Madrid, General Sales Manager
2200 Northern Blvd., East Hills, NY 11548
tel: 516/801-9482
e-mail: foodandbeverage@pall.com
website: www.pall.com

PLEASE SEE PALL CORPORATION AD, PAGE 50.

WESTERN SQUARE INDUSTRIES

Western Square is the wine industry's largest supplier of portable steel barrel racks, including stainless steel racks in two popular models: the double-inside bar two-barrel and four-barrel racks. Western Square also provides a low profile inside-bar rack.



Western Square also manufactures The Barrel Master®, a rack-on-rack system. The Barrel Master system comes with traditional cradles or wheels, allowing winemakers to stir lees without introducing oxygen into a barrel. Traditional cradle allows stacks as high as eight barrels, not resting on each other, and uneven barrels and mixed cooperage in the same space. All racks are powder-coated.

Western Square manufactures two devices for holding a single barrel above two-barrel racks. One is a pyramid cradle that replaces four chock blocks, and the other is a removable center cradle.

Western Square produces a barrel-washing system to use with portable racks.

New products include The Barrel Guard® which prevents barrels from sliding off the racks. The Barrel Guard never needs to be removed. Another new safety device is The Barrel Clamp®, which clamps a barrel to the rack and can be installed in five seconds.

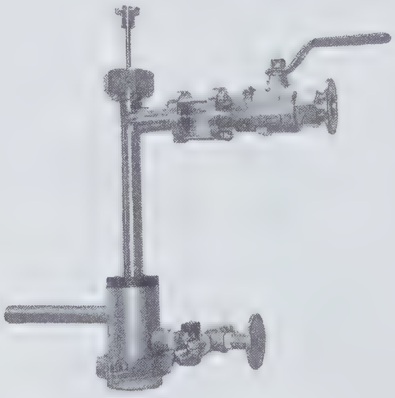
For more information, contact:
Western Square Industries
1621 North Broadway, Stockton, CA 95205
tel: 800/367-8383 (toll-free) or 209/944-0921
fax: 209/944-0934
e-mail: info@westernsquare.com
website: www.westernsquare.com

PLEASE SEE WESTERN SQUARE AD, PAGE 17.

THE COMPLEAT WINEMAKER (TCW)

TCW developed a suction wand to allow free-run juice to be pumped from an open top fermentor, leaving behind seeds and skins. It is also useful for pumpovers and temperature control in a tank or bin when drawing off wine for these operations.

There is a new Mori basket press from Italy, at a introductory price of $19,995 ($8,000 savings) until early March, 2006. The press has rotary dial pressure control set-point, 50 to 300 bars with ram directional valve; automatic continuous on-off hydraulic control at 50-differential pressure; high pressure / low volume (for pressing) and low pressure / high volume (for ram up/down movement) hydraulic pumps, lever-controlled; hydraulic cylinder pressure up to 300 bars; stainless steel pans and platen; one-year warranty and installation, operation and maintenance manual. Consultation on installation and startup by TCW.



TCW Pressure Wand

A TCW pressure rack wand was created and tested at several St. Helena, CA wineries, and found to meet and exceed functional expectations.

1. Available with/without sight glass or valves;
2. Dismantles completely for thorough cleaning/sanitizing;
3. Can be used also as topping system to force wine from kegs or any container with tri-clamp connections;
4. Totally height-adjustable for small or large containers.

For more information, contact:
TCW Equipment
(The Compleat Winemaker)
955 Vintage Ave., St. Helena, CA 94574
tel: 707/963-9681; fax 707/963-7739
website: www.tcw-web.com

PLEASE SEE TCW EQUIPMENT AD, PAGE 120.

STAR FILTERS

Star Filters has provided filtration solutions for more than 100 years. Recently, Star has focused their expertise towards the wine industry to offer four styles of filters, and filter media.

Star compact polishing filter — Standard features: portable, four-wheel, locking-caster design; six 47-cm precision-machined and internally ported plates for optimum sealing; large usable filtration area: 40% more per plate than a 40-cm design.

Star DE filter — has ten 12-inch thick DE plates, full 1.7 ft^3 of sludge capacity; 202 ft^2 of filtration area.

Star combination filter — has integral crossover plate that facilitates two-stage filtration; ten 12-inch thick DE plates; ten polishing plates; mix and match plates for specific product needs.

Portable membrane filter (*The alternative to DE filtration.*) — Single-pass filtration; steam sterilizable; retention ratings of 0.2 Fm and 0.5 Fm; stationary, high process-rate models available.

Star depth-style filter media pads — have high flow rate and capacity; high wet tensile strength; low extractable levels, low media migration; nontoxic; available in eight micron retention ratings (0.2 Fm–0.5 Fm).

All Star presses are available in custom sizes and manufactured with 304 stainless steel construction and polypropylene plates, to solve the difficult task of filtration. Star Filters, a division of The Hilliard Corporation, is headquartered in the Finger Lakes region of New York state.

For more information, contact:
Star Filters
100 W Fourth St., Elmira, NY 14902
tel: 607/733-7121; fax: 607/737-1108
e-mail: hilliard@hilliardcorp.com
website: www.hilliardcorp.com

PLEASE SEE STAR FILTERS AD, PAGE 58.

VIGNERON CORPORATION INTERNATIONAL

Vigneron Corporation International, a supplier of compact filler systems for liquid food grade and commercial applications, will begin shipping an updated version of the Mini-4 and Model 2 fillers, packaged in a new, high strength poly-plastic composite.

Vigneron™ Corporation

The poly-plastic composite has many advantages, including resistance to denting and oxidation; lighter weight; maintains a hygienic finish far longer than stainless steel; is nearly shatter-proof, and offers sound deadening qualities that are also desirable. The seams are all but invisible, making for a very smart looking finish (see photo).

The units feature an innovative loading tray that has 20 adjustable height positions, making them adaptable to nearly any standard bottle size between 1 oz and 3 liters. Bottle fill time per four bottles yields up to several hundred bottles per hour, depending upon bottle size.

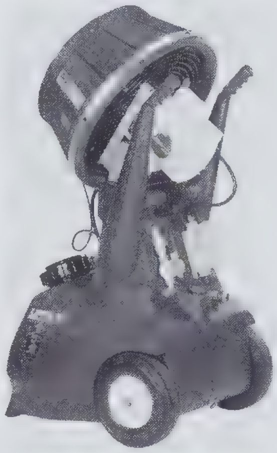
Introductory retail pricing is $2,395 for the Mini-4 and $2,495 for the full-size Model 4.

For more information, contact:
Vigneron Corp.
1719 Little Orchard St., Ste C
San Jose, CA 95125
tel: 408/977-0813; fax: 408/977-0866
email: tomr6@sbcglobal.net
website: www.vigneron-sp.com

PLEASE SEE VIGNERON CORP. AD, PAGE 25.

JAYBIRD MANUFACTURING, INC.

Jaybird manufactures a commercial line of fine-mist fogging units, perfectly suited for wine storage humidification. With three major product lines to choose from, Jaybird has units to suit any size barrel room. From durable mobile floor units to hanging fan units, Jaybird brings all the advantages of high-tech fogging down to simple stand-alone independent units. Enormously powerful and attractively priced, Aquafog® humidifying fans do not require high-pressure pumps or massive air supplies for operation. The nozzle-free units connect and operate from ordinary utility supplies and have fully adjustable fogging output capability.



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NATIONAL CLEAN PLANT NETWORK

Clean vines for healthy vineyards

BY Mark Chien, Penn State Cooperative Extension
Deborah Golino, Foundation Plant Services, UC Davis

A healthy vine is fundamental to the successful beginning and sustainability of all grape vineyards. Growers depend on commercial grapevine nurseries for vine stock that is pathogen- and virus-free with the desired cultivar, clone, and rootstock. To achieve these conditions is not an easy task, either for the nursery or the clean plant program that provides importation and certification services.

Viticulture has become much more complicated in the past decade with a tremendous variety of grape material that wine growers in vastly different conditions can select. Interest in new varieties, clones and rootstocks has increased and resulted in the importation of many new materials from diverse international sources.

Some cold hardy Minnesota hybrids can survive temperatures below –30°F, allowing grapevines to be grown in previously forbidding areas. The grape breeding program at Cornell University (New York) has produced many commercially successful varieties including Chardonel and Traminette.

The wide variety and variability in plant material comes with great promise for improved wine diversity and quality but not without considerable risk for disease and virus problems and mis-identification.

For decades, Foundation Plant Services (FPS) at University of California, Davis, (formerly known as the Foundation Plant Materials Service), has been the major source of vine materials for grape vineyards in the U.S. FPS Director Deborah Golino holds U.S. Department of Agriculture (USDA) grape importation permits that allow introduction of new materials from outside the U.S.

Scientists in New York and Missouri possess importation permits allowing them to introduce new clones and varieties for regional variety and breeding trials. Recently, Washington state established a foundation plant service at the Washington State University research facility in Prosser.

Development of smaller regional facilities, including one planned in the Mid-Atlantic region to serve vineyards in the eastern U.S., are a clear indicator of the increasing need for programs addressing region-specific plant material needs. New funds and resources are being sought to improve clean plant programs. As these programs develop, it will be important to coordinate their activities for maximum efficiency and quality.

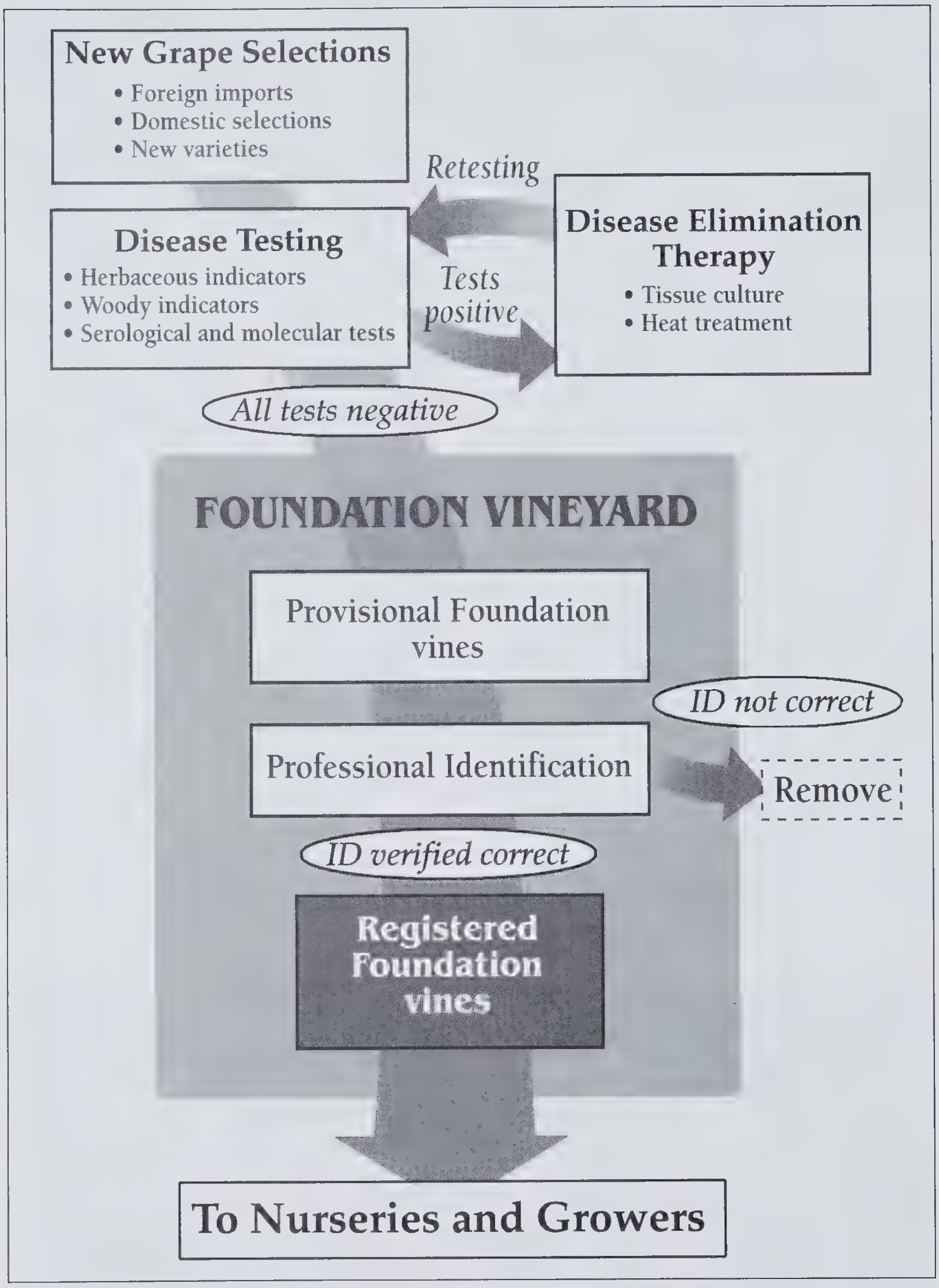
The National Grape and Wine Initiative (NGWI) is cultivating a national landscape for grape and grape product research and extension services. After a series of meetings to set priorities, one of seven program areas identified was **Clean Plant Materials** with the following objectives and benefits:

OBJECTIVE: Provide growers with a broad range of disease-free grape varieties, rootstocks, and clonal materials which have been evaluated for suitability and quality attributes.

BENEFIT: Improves plant health and quality. Prevents loss of vineyards, plants, and crops to disease. Improves quality of final products by increasing selection of and information about a wide variety of plant materials. Provides practical guidelines for evaluation of vine-site suitability.

Nancy Irelan, the NGWI research committee chair, collaborated with Golino to organize a September 2005 meeting in Davis, CA to address this directive at the national level. It was an opportunity for foundation plant ser-

Intensive care and special growing media are required to grow a 0.5mm shoot tip into a rooted plant in a test tube. This shoot-tip grape plant is ready to transfer to soil at Foundation Plant Services, UC Davis. (Photos courtesy of UC Davis)



Schematic showing sequence of tests that new grape introductions undergo at Foundation Plant Services. It can take several years to complete the laboratory and field tests to qualify a grape selection for the Foundation Vineyard. When Foundation Stock vines, fruit, and ampelographers confirm a selection's identity, it qualifies as California Registered Stock.

vice scientists interested in clean plant programs to assess current resources and capabilities and to evaluate how regional programs can improve their products and services through greater cooperation.

Assessment and gap analysis of program resources and facilities were provided by each FPS group. One example is an urgent need for regional programs that can deliver cold-hardy and crown gall-free vines for vineyards threatened by winter injury. Petri disease, eutypa, bot canker, and other trunk-related maladies are increasingly recognized as a problem for young and old vines in all viticulture regions. Tomato ringspot virus is a serious problem in Vidal Blanc, an important hybrid variety popular in cold climate vineyards.

Grape importation services are provided by FPS to private industry and public researchers on a fee-for-service basis. This is an extremely valuable entry point for grape varieties, clones, and rootstocks from regions around the world. FPS provides many other services to industry, including disease testing, biological indexing, elimination of plant pathogens, professional identification of grape varieties, foundation block maintenance and distribution, outreach and education, and characterization and registry of grape plant materials.

A tour of the foundation facilities showed the great complexities in each area and the enormous record-keeping burden needed to preserve a paper trail on all plant material entered, treated, and delivered. Recent cooperation with other foundation services such as ENTAV in France has led to a proliferation of high-quality grape materials available to the wine industry in the U.S. Please visit http://fps.ucdavis.edu/Grape/GrapeProgram-Index.htm for more information about the history and services of FPS.

In Washington state, the Northwest Grape Foundation Service was created with cooperation from Oregon and Idaho, at the Washington State University research station in Prosser. Initiated in the 1970s, the program was revitalized in 2003 with significant federal and state funding. It seeks to provide virus- and crown gall-free vines to an industry that has grown to over 30,000 acres and is threatened by winter injury.

In Prosser, disease testing is offered and a foundation vineyard has been established, but there is no importation permit. Other vine problems in Washington include viruses (leaf roll and fan leaf, corky bark, rupestris stem-pitting, arabis mosaic virus, tomato ringspot), Petri disease, crown gall, and eutypa. All of these are common to most grape regions but vary in degree of severity. More information about the NWGFS is available at: http://nwgfs.wsu.edu/.

The program at Southwest Missouri State University, (Mountain Grove, MO), has a collection of Eastern European varieties and hybrids currently being tested for viticulture and wine suitability, and a disease testing and elimination program for nine viruses. Five important regional varieties have been selected for virus-free certification including Norton, Vignoles, Chardonel, Chambourcin, and Vidal. Dr. Wenping Qui is the program leader and holds an APHIS importation license. More information about the SWMSU foundation program is available at: http://mtngrv.missouristate.edu/GrapeImport.htm.

A foundation program has been proposed and funding sought to serve the Mid-Atlantic and eastern regions. A collaboration between Penn State, University of Maryland, Virginia Tech and their states' departments of agriculture seeks to address two major problems in new vineyards, crown gall and tomato ringspot virus. Penn State has invested heavily in recent years to determine the extent and cause of vine decline problems in young and mature vineyards. Smart cycling PCR technology has been refined for use in pathogen detection and can help to ease and quicken the analysis process.

Cornell University (New York state) has managed a voluntary vine certification program in the past, but it has been dormant until the arrival of grape virologist Dr. Marc Fuchs, formerly director of research at INRA-Colmar in France. Dr. Fuchs specializes in grape viruses, and is now the plant virologist at the New York State Agricultural Research Station (Geneva, NY).

Program goals for Dr. Fuchs are to develop virus control measures through improved detection methods and genomics research. Cornell University is currently evaluating its foundation grape service program and how it may be further developed.

These working and planned foundation programs are part of the National Clean Plant Network (NCPN). While not yet formalized as an organization, there is strong agreement among the principals in each group that a national network would benefit each region and program and the grape and grape products industry as a whole. The current program includes tree fruits, so the term *plants*, not *vines*, is appropriate.

Goals of this group would be to join forces and, as a team, address diverse and specific grape material needs of all grape regions in the U.S. by creating the most efficient and effective network of foundation plant services possible. By forming a closed loop network, the group can avoid duplication, share resources, backup materials and data, improve services, increase efficiency and throughput and be more responsive to regional and national industry needs.

Education and outreach services are important to the success of each foundation program. Growers and commercial nursery cooperators must understand the problems caused by plant viruses and pathogens and the importance of clean and healthy vine materials, and how to properly and effectively utilize plant materials from foundation services. Users must realize that certified materials are not a guarantee against developing plant problems but rather an additional assurance that a healthy plant will be established.

Industry experience is essential in determining which selections are needed in clean plant programs, what new cultivars and clones should be imported from abroad, and priorities for therapy of cultivars that are in the U.S. but are not available as clean stock by importing promising cultivars and clones, for example.

Perhaps most important, these foundation programs will seek stable funding through a variety of public and private resources. Currently, FPS relies on grants and fees-for-service for operating expenses. The Washington program has received federal and state grants, but these are limited in duration and will eventually be supplemented by service fees. Once the network is up and running,

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it will be presented to USDA as a vital resource for an important agricultural industry and should receive stable annual funding from the federal agency.

Additional goals of NCPN include the creation of a national registry of grape plant materials, creating a national set of standards for testing grape materials, a review of the current APHIS rules that regulate importation and testing, the development of a selection system in cooperation with the grape and wine industries, improvement of outreach and education services, improved plant identification methods, and evaluation of how grape genomics can improve the quality and types of grape materials available to the winegrape industry.

The group will also seek to evaluate and understand the economic impact of the vine materials to the industry and economies of grape growing regions. An educational program is needed to inform industry members and stakeholders and partners of the essential value of clean vine materials, importation capabilities, and other benefits provide by the NCPN.

Next steps include further evaluation of resources, products and services, creating a clear link to industry to understand their plant material needs, developing an understanding of the economic impact of foundation plant services programs and of vine problems experienced by growers.

There is nothing more fundamental to a successful and high quality wine or grape product than starting with a clean and healthy vine. Every grape grower in the U.S. has a stake in the success of these programs. ■

FPS laboratory staff utilizes PCR and ELISA technology to accurately detect grapevine viruses. Routine laboratory testing of new introductions, shoot-tip culture plants, and foundation stock complements the visual field indexing. (Photo by Jack Clark)

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AGRICULTURAL LEADERSHIP

Wine industry members participate in two-year program

BY **Amy Christensen,**
Director of Alumni Relations and Communication
California Agricultural Leadership Foundation

In 1976, Ray Tonella was finding his stride as director of grower relations for Christian Brothers Winery, (Napa, CA). He was making time for his own 50-acre vineyard and enjoying a new life, post-military service. As he puts it, his life and career were a "family affair, all-encompassing — there wasn't much opportunity to really see the world." All that changed when Tonella became a member of Class No. 7 in the California Agricultural Leadership Program.

"It was such a broadening, eye-opening experience," Tonella recalls now. Like hundreds of others in the winery and viticulture business, Tonella had the opportunity to participate in the two-year fellowship program and gain, as he says, "invaluable experience off the farm. If I had to pick a single thing in my life — from high school, college, the military — with the layers and complexity that made me who I am today, it was the Ag Leadership program."

Others share Tonella's perspective on the program's role in their lives. Its unique approach to issues facing agriculturalists, and the emphasis placed on pushing individuals beyond their personal comfort zones, make the experience unlike any other.

AgLeadership
CALIFORNIA AGRICULTURAL LEADERSHIP FOUNDATION

Inspiration for the California Agricultural Leadership program occurred in the late 1960s when a group of California growers hosted 30 young farmers from Michigan who were involved in such a program sponsored by the W.K. Kellogg Foundation. The growers enlisted assistance from the Council of California Growers to provide resources for creating a new agricultural leadership program for the state. The first class was seated in 1969.

Bob Steinhauer of Foster's Wine Estates (St. Helena, CA) was a member of the first class. Steinhauer recalls that the experience was about refining the California farmer and equipping classmates with new tools for business, including public speaking and cultural awareness. It provided a big-picture perspective and introduced not only new ideas within agriculture, but also on the larger world beyond.

"I am convinced that nowhere else would I have gotten this kind of focus and experience, even in industry," says Steinhauer. He also credits the program with providing the skills necessary for later tackling difficult issues, such as the influx of Glassy-Winged Sharpshooter (GWSS) and Pierce's disease (PD). As former chair of the California Department of Food and Agriculture PD/GWSS Board, Steinhauer has been actively involved in this critical issue. His successor as chair of the PD/GWSS Board, was another Ag Leadership alum, Brad Lange.

Steinhauer adds that he can credit the program for "who I am," including his commitment to developing tangible solutions to problems impacting the wine industry.

Many other graduates of the program have also used what they learned to address tough issues. Ben Drake (Temecula, CA), has also been actively combating GWSS and PD in his region. A member of the California Association of Winegrape Growers (CAWG) since 1982 (and now its board chair), Drake used his board-member role to get critical information out to those in the industry.

As owner of a farm management company overseeing 300 acres of vineyards, his livelihood hung in the balance when the situation turned critical. "I will admit that I may not have engaged in GWSS/PD had I not participated in the program," notes Drake. "It instilled a greater desire to serve."

Ag Leadership alumni tend to take on the challenges facing their regions and lend their efforts to work on issues that improve the industry as a whole. Cathy Baranek (Courtland, CA), is a graduate of Class 19 and office manager for Ehrhardt Estates, a two-year-old winery with 525 acres of vineyards. While the program built upon existing skills of its participants, the greatest benefit, according to Baranek, was exposure to the industry's political side.

Engaging in land use and environmental issues and the role of the community was really what got her attention, and helped motivate her to tackle a now 14-year endeavor, Baranek explains. In 1991, she helped found the North Delta Conservancy, a 501 (c) (3) non-profit organization dedicated to providing more efficient support for growers and landowners in the Sacramento River Delta region. The group was formed, she adds, after the federal government decided to make the entire delta region a wildlife refuge. The landowners' efforts immediately following that announcement were not succinct or effective, so the North Delta Conservancy was born.

The organization has spent 14 years since attempting "to conserve, sustain and enhance the cultural, recreational, wildlife, and other natural habitat resources of the Sacramento River Delta region by developing and promoting sustainable protection, management, and stewardship programs through research and education." Baranek recently resigned from her role overseeing the group, but acknowledges that her spark and interest in issues of this nature were developed in Ag Leadership. "The program just makes you a better person," says Baranek

Baranek is also one of many program graduates to keep things in the family: her husband John Baranek is a graduate of Class 11.

Another family to pass along the Ag Leadership tradition is the Talleys of Arroyo Grande. Father Don, mother Rosemary, and son Brian are all alumni, and Brian is leading the family's winery business today. As president of Talley Vineyards, he acknowledges that the business has benefitted greatly from the multi-generational involvement.

Talley recalls that, at an early age, he noticed his father's class involvement and the changes it inspired in the business. When the time came for Brian to apply, he thought his second-hand benefit from the program was sufficient. But parental insistence could not be ignored, and Brian was surprised at just how much personal growth he experienced through the Ag Leadership program.

Talley asserts that his endeavors following the program were spurred on by the lessons of mature leadership he learned there. Those lessons are evident in his co-founding of "The World of Pinot Noir" — a Central Coast event that "brings together national and international wine producers, providing an educational setting in which to further the enjoyment of Pinot Noir."[2]

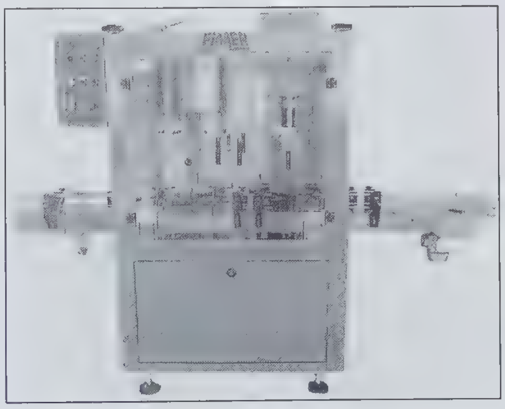
Like his father and mother before him, Brian credits the program for re-energizing his role as a parent. The program's emphasis on tending to the next generation in all aspects has led to a greater commitment to family — in his case, as an American Youth Soccer Organization coach and local board member. "Because of their age (Elizabeth, 9 and Olivia, 8), I feel compelled to be as active in their lives as possible … and Ag Leadership validated that responsibility for me as a parent."

While not all Ag Leadership graduates have multi-generational participation, the program creates a unique bond similar to that of a family. After two years together, a camaraderie is formed that can be used in powerful, innovative ways.

An example is the Lodi Woodbridge Winegrape Commission (LWWC). The commission, founded in 1991 and serving the interests of winegrape producers in the Lodi-Woodbridge Crush District 11, came about after the statewide commission sunset in 1988. At that time, with the decline of the Flame Tokay grape market and the need for unified efforts still pressing, a group of Ag Leadership alumni joined forces to form an organization that met their needs in a fresh new way.

Using their knowledge of process management and capacity building, Pat Brown, Brad Lange, Randy Lange, John Ledbetter, Pat McCarty, Larry Mettler, and Richard Watts proactively addressed their regional issue. Ledbetter states, "This commission was formed because of the tools we gained through Ag Leadership — we saw a problem and fixed it."

LWWC is run by another Ag Leadership graduate, Mark Chandler, executive director. Chandler advocates for the mission of the organization, particularly in the area of sustainable agriculture. Under his watch, the group wrote the first set of region-wide sustainable viticultural standards: *The*



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Lodi Winegrower's Workbook. Those practices are now being implemented across California, and LWWC is recognized for taking that first, necessary step.

"The industry is much more environmentally-sensitive because of leaders from the program," says Chandler. "Lessons learned have brought us to the table with 'opponents' and allowed us to reach pioneering compromise.

"The real accomplishment of the Lodi Winegrape Commission has been fundamentally changing this grape-growing district and its reputation to the status it enjoys today. We now have more than 60 wineries, where there were only eight before, and our wines are 'besting' the best in major wine competitions. None of that would have come about without the leadership of Ag Leadership graduates in Lodi," concludes Chandler.

The role of Ag Leadership has been acknowledged by many people outside the program. "California winegrowers face significant challenges," says Karen Ross, CAWG president, "including farming in the country's most populous state with the associated ag-urban interface issues and maintaining sustainable businesses in a fiercely competitive global market.

"We need leaders who are engaged in developing solutions in their local communities, in their industry associations, and in the public policy arena. The wine community has greatly benefitted from the California Agricultural Leadership Program, with nearly 10% of all the participants in the 30+ years of the program. They are folks who are making a difference for our industry every day. The list of people who have translated their two-year Ag Leadership experience into action that benefits the wine community is very impressive."

That list continues to grow. The program began the 36th class in 2005, with the intent of continuing to provide transformational leadership development to individuals through experiential learning and personal reflection.

As the next group of leaders embarks on its two-year journey, the possibilities for benefiting the wine industry are endless. One thing seems certain: As long as the California Agricultural Leadership Program exists, the wine industry will continue to have committed, innovative leaders ready to take charge. ■

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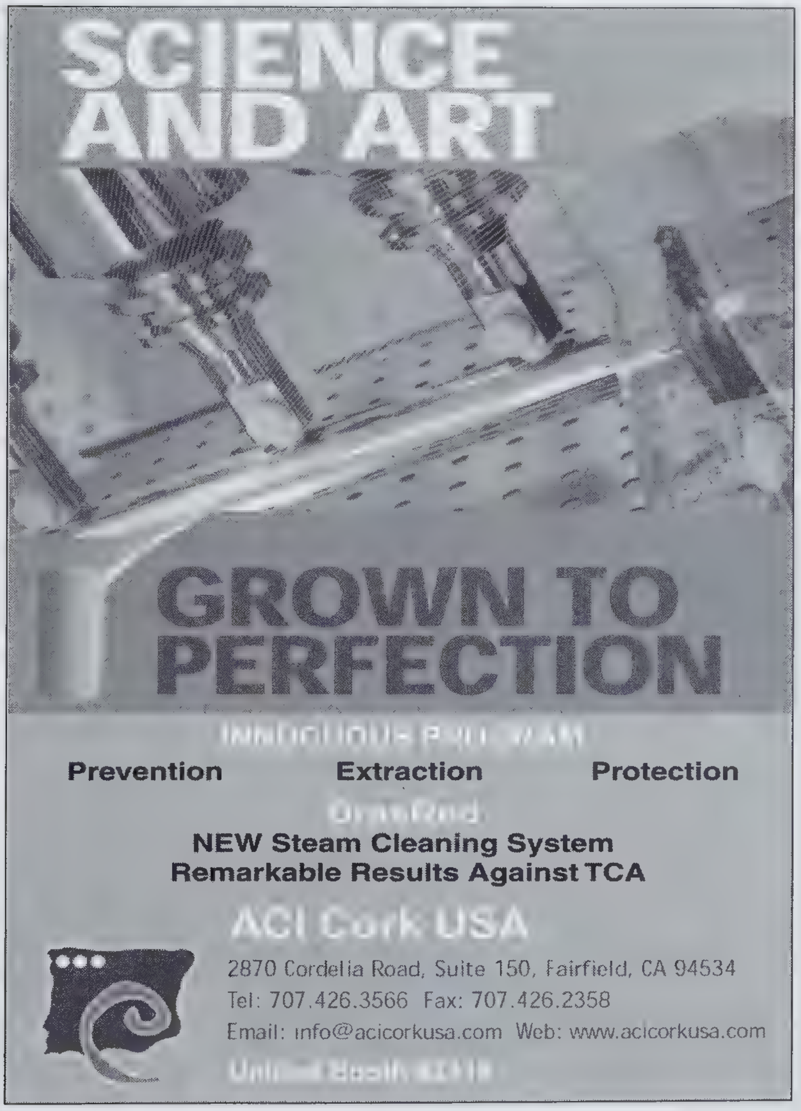
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SB 118

Continued from page 73

in a degree of complexity, it is clear that other forces are at work. For example: one can debate the true cost of processing a permit or license, but it seems more likely to conclude that high fees like South Carolina at $600 every two years and Nebraska at $500 are designed to discourage wineries from applying.

California's $10 fee is an invitation to apply. New Hampshire started out with a $228 annual fee, but ultimately waived it when it became apparent that wineries were not applying.

Application requirements often create another barrier. John Peirce (Department of Alcoholic Beverage Control General Counsel), notes that California's application is one half-page and relies on basic business information and existing licenses issued by other states. Virginia, Connecticut, and New York are examples of applications that defy simplicity. Connecticut's has been described as a "book." If so, then California's qualifies at the *Cliff Notes* version.

There are differences in how much a consumer can order and differences among states in requiring what data to collect and how often to report it. Some states require permit-holders to register each brand that will be sold in the state, others do not.

The tax issue has proved particularly nettlesome. Some states require that local transaction taxes be paid and state sales tax. Because these tax rates vary by locality, the complexity factor increases tremendously. Anecdotally, I've heard from members of Family Winemakers that because sales volume is very small, they often write checks for less than $1 just to be current within the reporting time frame.

California's approach is one statewide rate, with submission frequency dictated by sales volume. The wine industry has been very clear that it is willing to pay taxes as part of direct-to-consumer sales, but just like any business, a degree of uniformity would be helpful, particularly for small producers.

Finally, I would like to note another barrier that has emerged in legislation, which dampens direct-to-consumer winery sales. Some states are erecting annual sales caps perhaps as a way to shelter in-state businesses. The Texas statute limits direct shipper licensees to no more than 35,000 gallons annually (about 14,700 cases). The Michigan statute signed by Governor Granholm, will limit annual sales to 1,500 cases per winery per year. The Massachusetts bill, if the veto is overridden, prevents large producers from even applying for a permit. Most small wineries will fit easily under these caps, but artificial limits hinder consumer choice. California, on the other hand, welcomes all comers.

SB 118 which took effect on January 1, 2006 is simple and workable. It is a standard that other states interested in promoting consumer choice and developing their own wine industry could emulate.

In summary, Family Winemakers of California believes that additional work needs to be done in states that have permit systems to simplify the cost and administrative requirements that act as a dis-incentive for small producers. Consumer choice suffers if out-of-state wineries decide not to participate in direct-to-consumer sales because of artificial barriers.

We ask Senator Chesbro, chair of the California Senate Select Committee, to introduce a joint resolution in the 2006 legislative session that memorializes the states where the burden is high to fix regulatory requirements so that direct-to-con-

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sumer winery sales will have a chance to flourish, and so that the promise of *Granholm v. Heald* can be realized. ■

Remarks made before the California Legislature; Senate select Committee on California's Wine Industry; Senator Wesley Chesbro, Chair. Thursday, December 8, 2005.

TO Senator Wesley Chesbro:

Thank you for this opportunity to address the California Senate Select Wine Committee, I am Louis Foppiano and I oversee our family's winery, Foppiano Vineyards in Healdsburg, CA. My remarks are on behalf of the Wine Institute, of which I am a director.

I would be remiss if I did not state how appreciative we are to you and your committee consultant, Susan Boyd, for championing direct shipment issue and authoring SB 118 which passed the California Legislature, virtually without opposition!

The December 8 hearing has focused on California wineries' ability to self-distribute to consumers.

I want to address another looming issue: a winery's ability to self-distribute to retailers. As you know the Supreme Court case of *Granholm vs. Heald* stated that states may no longer discriminate. This implication challenges the legality of the ability of California wineries to sell directly to California retailers, while denying the same privilege to out-of-state wineries.

This is not theoretical, Virginia wineries, who lost this privilege in April-2005 have lost so much business that they are being forced to lay off personnel! Additionally, there are lawsuits pending in at least three or four states to overturn the constitutionality of self-distribution statutes unless they are extended to out-of-state wineries. It is just a matter of time to when this will happen in California.

In early December, the Wine Institute began grappling with this huge issue. None of our members want to lose their self-distribution privilege in California. This is very important to us, for if it comes to past, the total distribution of our product would be in someone else's hands.

Some states are proposing "capacity caps" in order to exempt small wineries from this prohibition and to allow them to sell direct. Though this may sound great, in actuality, the lines between large and small are quite fuzzy. Example: a small winery may sell its wine for a very high price and a large winery may only make pennies per case on the wine it sells. As you can see, who is who, the small winery with high profits or the large winery with small profits.

It is the Wine Institute's goal to provide you and your committee with our recommendations on this issue early in 2006.

Louis M. Foppiano
Foppiano Vineyards
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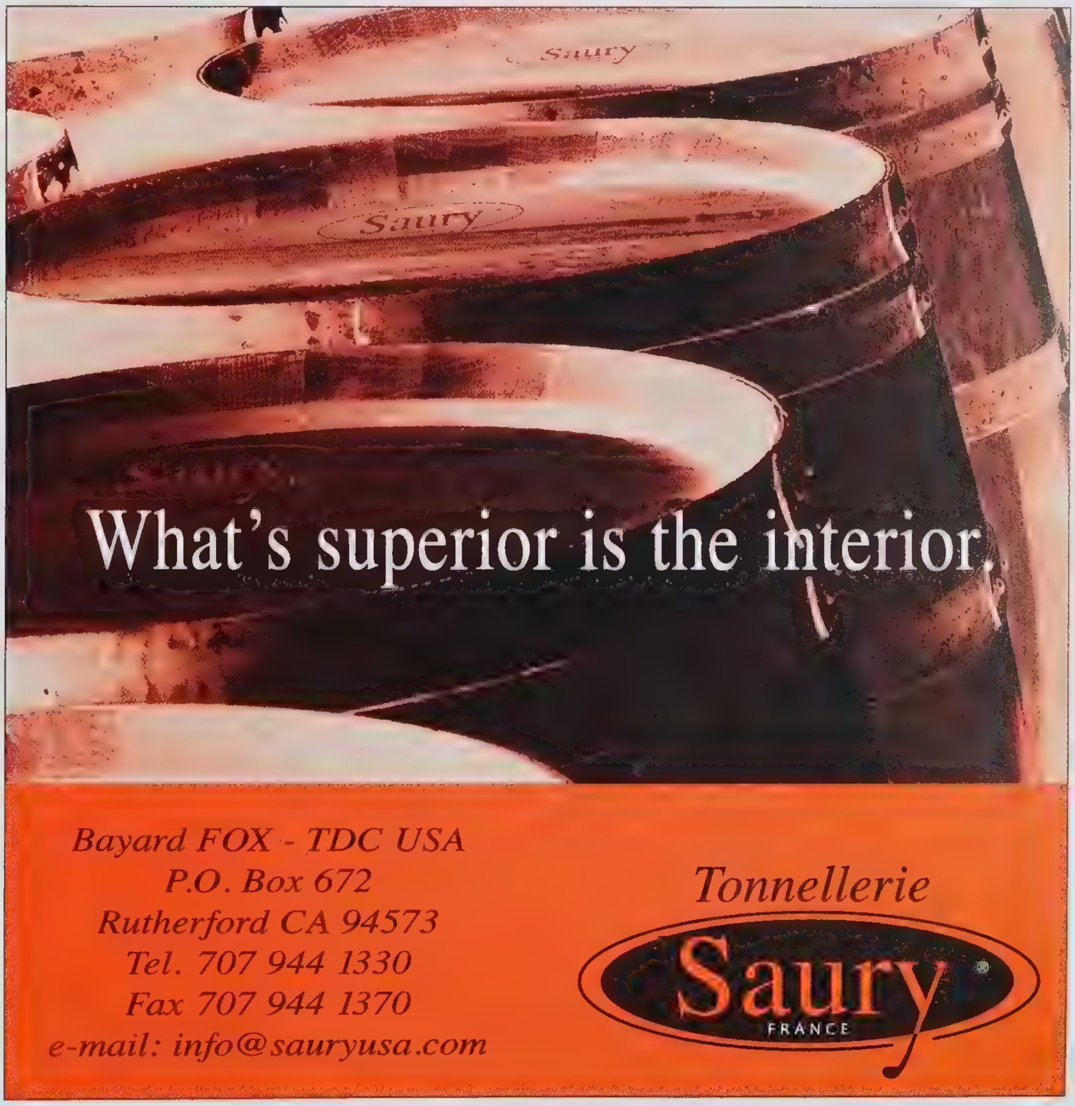

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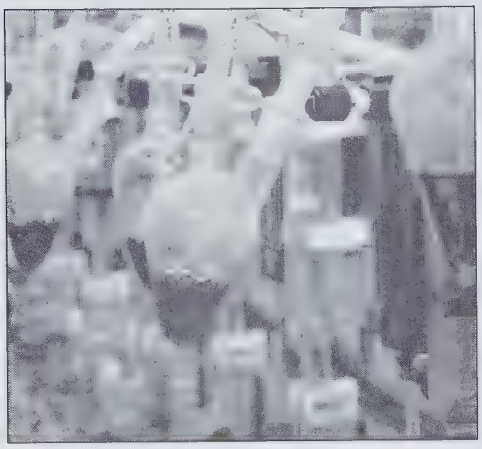

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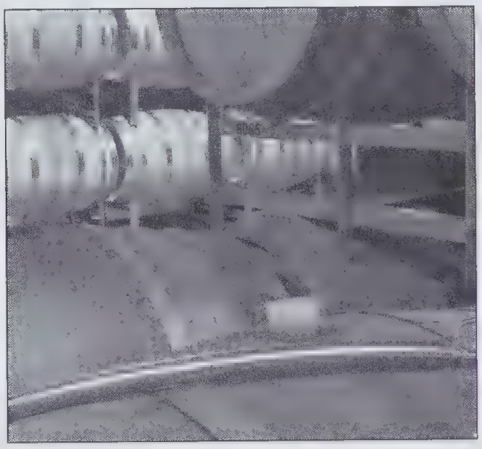

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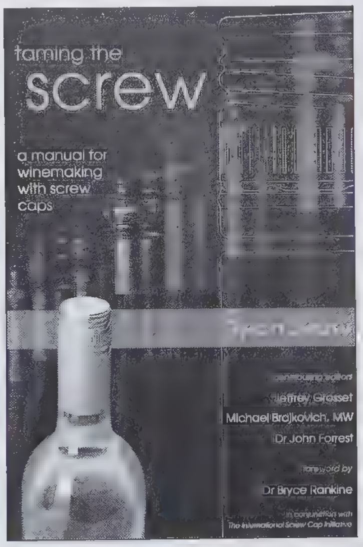

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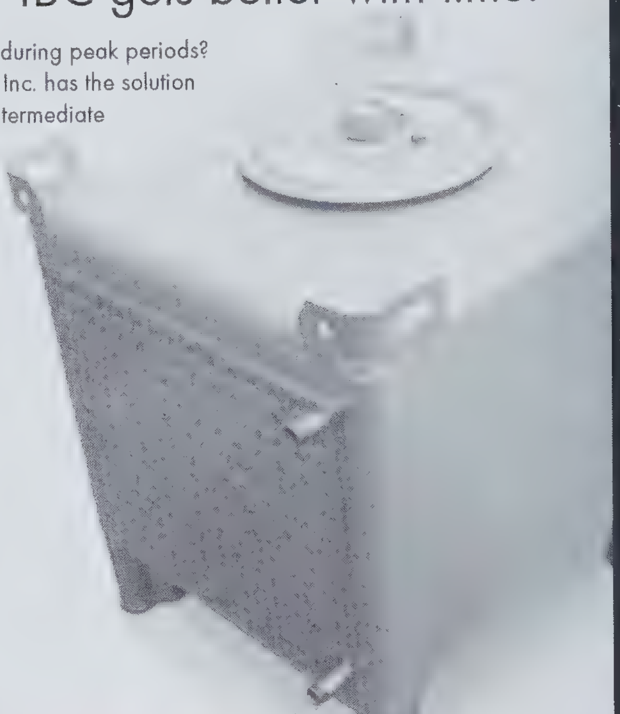

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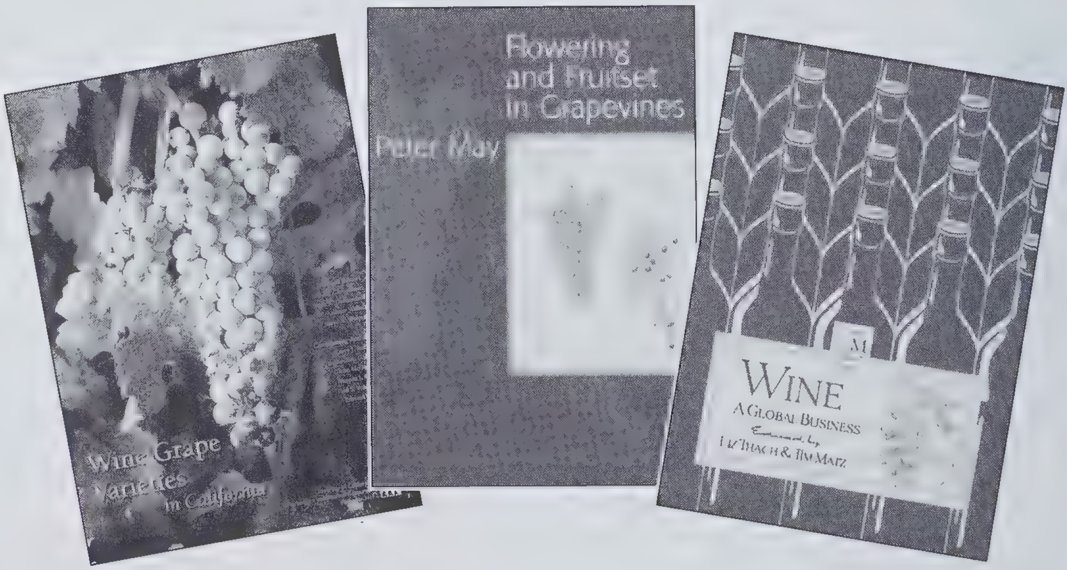
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Mealy Bug

Continued from page 46

If spring or summer foliar treatments are necessary, attempts should be made to minimize adverse effects on the resident population of beneficial insects commonly present in vineyards. This can be achieved by leaving areas of the vineyard untreated, and by utilizing insect growth regulators that primarily target mealybug pests.

VINE MEALYBUG: If vine mealybug is found in a vineyard, treatment is recommended. The objectives for chemical control are to obtain clean fruit and to avoid development of populations in the canopy. Large populations in the canopy may hasten spread during leaf fall (which may occur prematurely due to vine mealybug feeding). Reducing the numbers of vine mealybug in the canopy prior to harvest is essential to prevent spread of the pest during harvest.

At the delayed dormant period, just prior to bud break, the majority of the population is under the bark in the lower part of the trunk. Effectiveness of a treatment at this time may be improved if bark is removed on the most infested vines prior to the application. In areas with light-textured soils, an effective spring and early summer control is a soil-applied systemic insecticide at bloom as a single or a split application.

Summer foliar applications are warranted to insure clean fruit and to avoid having a large population in the canopy at harvest. When making summer applications you may be limited by pre-harvest intervals. The earlier you find an infestation the more chemical control options you have to control this insect before harvest. It is strongly recommended that all vineyards be monitored with vine mealybug pheromone traps for early detection. For information on trapping, please consult the references cited below.

The most effective timing to reduce vine mealybug populations is *immediately after harvest* before the nymphs begin to move to lower parts of the trunk. This is when the highest percentage of the population is exposed in the canopy and on outside of the bark. Good control at post harvest will minimize the overwintering population and may reduce the need for a delayed dormant spray, when control is less effective. ■

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PERSONNEL POINT OF VIEW *by Shelley Brott*

"Ooops … I did it again"

(How not to manage performance)

My phone rings. I answer. The winery owner on the other end of the line is looking for my support regarding a "sticky" employee situation. According to the supervisor, it is definitely time to terminate this employee.

I ask the usual questions that a Human Resources Consultant would ask, such as: Have you spoken with the employee about your concerns? (Not really.) Have you documented these discussions? (What discussions?) Have you documented the employee's performance issues? (Once; three years ago.) Why are you terminating the employee now? (Because I can't take it anymore!) You get the idea.

You might have heard a story like this before. The story might have come from me or from someone you work with. Or, maybe it's your story. In any event, this is a situation that is repeated all too often. Are these bad managers? Absolutely not. Should these employees be terminated? Generally yes. But those terminations are made a lot more complicated when there have been missteps along the way.

Too often, managers make mistakes that hamper their ability to deal effectively with their employees' performance issues. We are all human beings, and we make human mistakes. I'll have to be very honest here. I made some of these same mistakes while I was an HR manager. Oops!

Let's take a closer look at some of the common manager mistakes, so we can all do a better job of avoiding them in the future. Do any of these examples sound familiar to you?

HIRING THE WRONG PERSON. In my experience, many "poor performers" are actually employees who are placed in the wrong position to begin with. I could write an entire column or two on this subject. In fact, I already have.

The point I want to emphasize is the importance of taking the time to "hire smart." Make sure you know the requirements of the position, and make sure you recruit and interview to meet those requirements. I can't tell you how often I have counseled managers about poor performers they "should never have hired in the first place."

We all know that job requirements include things like education and work experience. But job requirements also include things like interpersonal communication skills, the ability to work as a member of a team, and the ability to juggle multiple projects.

Also, don't forget the importance of hiring someone who really wants the job. How will they function within your particular company culture? Will they mind all that travel? Is this really the type of work they want to do? All too often, I see situations where potential employees have the necessary skills, but fail because they are not a good fit with the position and/or the company.

MAKING PROMISES YOU CAN'T KEEP. This mistake typically happens during the hiring process, but can also come up at other points in the employment relationship. Supervisors and managers sometimes make "innocent" comments that can be interpreted as a "promise" by an employee.

Here are a few examples: "We are looking forward to a long relationship with you." "We give substantial raises every year." "We have never terminated an employee here." "We give multiple warnings before any termination." "After five years in this position, we'll make you the supervisor." Ouch.

Such statements can create expectations on the part of an employee — expectations that may not pan out. Your words might come back to haunt you if you do need to lay-off or otherwise terminate this employee.

Those "innocent" comments are even problematic for those of you who work in "at will" companies, in "at will" states. Comments like these can give your employees the impression that they are not really "at will" after all. Yes … another potential complication in that sticky termination.

FAILING TO SET PERFORMANCE EXPECTATIONS. Okay. You've hired the right employee, and you haven't made any unfortunate promises. Your next step is to make sure that employees understand what is expected of them from the very beginning. This gives them a fair shot at meeting your expectations, right? Sounds pretty obvious, but this often doesn't occur.

I have seen many situations where a supervisor is providing constructive feedback to an employee, only to discover that the employee didn't know what was expected of him or her in the first place. Not a productive approach.

One of my favorite examples is the employee who was in trouble for being tardy. It turned out that nobody had ever told him that his expected report time had changed. How's that for communication?

Obviously, the best approach is to give employees clear, direct information about what is expected of them, and then hold them accountable for those expectations. That leads us to the next point.

NOT PROVIDING ONGOING COACHING AND FEEDBACK. All too often, we get caught up in our own hectic schedules and don't take the time to really manage our people on a daily basis. So, we let them "do their own thing" until it's too late. Then, we suddenly find ourselves coming down hard on the employee for something that we should have been giving feedback about all along. A mentor of mine once called this the "leave 'em alone and ZAP!" method of management. How true.

A much more productive approach is to provide regular, ongoing coaching and feedback to employees. Let them know when they hit the mark and when they need to do things differently. Help them build on their strengths and minimize their weaknesses. You'll be supporting your employee and your business.

When you provide feedback and direction to your employee, make sure that it is clear, direct, and understandable. Make sure the employee understands your message and what is expected moving forward, whether it is "more of the same" or "improvement needed. " Let employees know the impact of their performance — on you, on the organization, on their co-workers, and on your customers. Engage your employees in discussion, making sure to get their input and ideas.

NOT PROVIDING REGULAR, HONEST PERFORMANCE EVALUATIONS. Does your organization have a performance evaluation system? I hope so. While performance reviews are not a legal requirement, they can provide an excellent forum for performance feedback and discussion — if they are done correctly.

Here is where I've seen performance evaluations "get in the way" of effective performance management. The first common mistake is not doing reviews at all. Too often, I have come across situations where "offending" employees have rarely (if ever) been given an evaluation, even though company policy says they'll receive one every year. You can see where this might cause a problem down the road.

The second common mistake is providing the performance review, but "sugar coating" the feedback. Many times, I've reviewed the personnel file of "problem" employees, only to find years of reviews that say they are "just fine." Enough said.

NOT ASKING THE RIGHT QUESTIONS. Take the time to do things right. I sometimes see managers jumping to conclusions too quickly with regard to performance issues. They see the unmet goals, the missed deliveries, the errors, and the costs, and assume that the employee is the problem. Sometimes they are. However, it is important to ask the right questions about the employee and about the situation.

Ask things like: Have I adequately communicated my expectations? Do employees have the skills they need? Have they been trained? Are the standards and expectations realistic? Do they have the tools and resources that they need to be successful? Are there obstacles in their way, either internal or external to the organization? Have I been rewarding poor performance by ignoring it?

Once you've answered these questions, you'll be much better able to deal effectively with the true issues — whatever they turn out to be.

ASSUMING THAT IT'S "TOO LATE" TO DEAL WITH THE PERFORMANCE ISSUE. Over the years, I've worked with a number of managers who have assumed that they couldn't deal with an employee's performance problem, because the employee had "gotten away with it" for so long. This is the employee who has "come in late for years" or has been given a series of "Outstanding" performance reviews for "C–" performance.

This might be a situation that the manager never dealt with, for whatever reason. Or, it may be the case of someone walking into a new supervisory role, to be faced with a problem created by the previous supervisor.

Whatever the case, it is definitely not too late. It is never too late.

My usual advice in these situations is to have what I call a "drawing the line in the sand" meeting with the employee. Let them know where they stand. Tell them the rules are changing. Be honest with them. Let them know what will be expected of them moving forward — effective immediately.

Be willing to share the responsibility with this employee. You can say something like, "Joe, I need to share the responsibility here. I should have talked to you about this a long time ago. But, this is what I need from you from now on." Once, you've

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drawn that line in the sand, make sure to hold the employee accountable. Don't let the same mistake happen again.

ASSUMING THAT YOU CAN'T DEAL WITH "ATTITUDE" OR "PERSONALITY." I do a great deal of supervisory training in my consulting work. One of my more popular training topics is managing performance. When I do that type of training, participants often bring up those employees with "attitude." It appears that many supervisors are of the opinion that they can't deal with attitude problems, especially when the employee is doing a good job otherwise. Not so.

What I tell these supervisors is that attitude can be dealt with, as long as it is done in performance terms. For example: Mary is an employee in your tasting room and the customers love her. She has great wine knowledge, and she treats customers like royalty. Her sales are huge. However, when "behind the scenes," Mary does not treat co-workers well. She is uncooperative and is very condescending. Is there a performance issue? Absolutely. Can you deal with it? Absolutely.

Working as a good team member is an important part of Mary's job, along with her customer service requirements. What do you tell Mary? Do you tell her that she has a "bad attitude"? No. But, you should tell her about the specific behaviors that are affecting her job and her co-workers. And, you should remind her that teamwork and cooperation with her co-workers are requirements of her position.

NOT DOCUMENTING PERFORMANCE ISSUES AND DISCUSSIONS. It is critical to document your employees' performance and your performance-related discussions with them. This includes notes of informal conversations and formal disciplinary letters.

Unlike the earlier situation, where no feedback occurred at all, in this final example, feedback often occurs, but with no record or documentation. That could be a very costly omission — especially if you are challenged legally.

You may or may not have seen yourself or your organization in these examples. Either way, I hope this list has given you some useful food for thought. When it comes to effectively and productively managing people, we can never stop learning. ■

Shelley Brott is a Senior Associate with The Personnel Perspective, a human resources consulting, training, and recruiting firm in Santa Rosa, CA. She has more than 25 years of management and HR experience. You can contact her at 707/576-7653.

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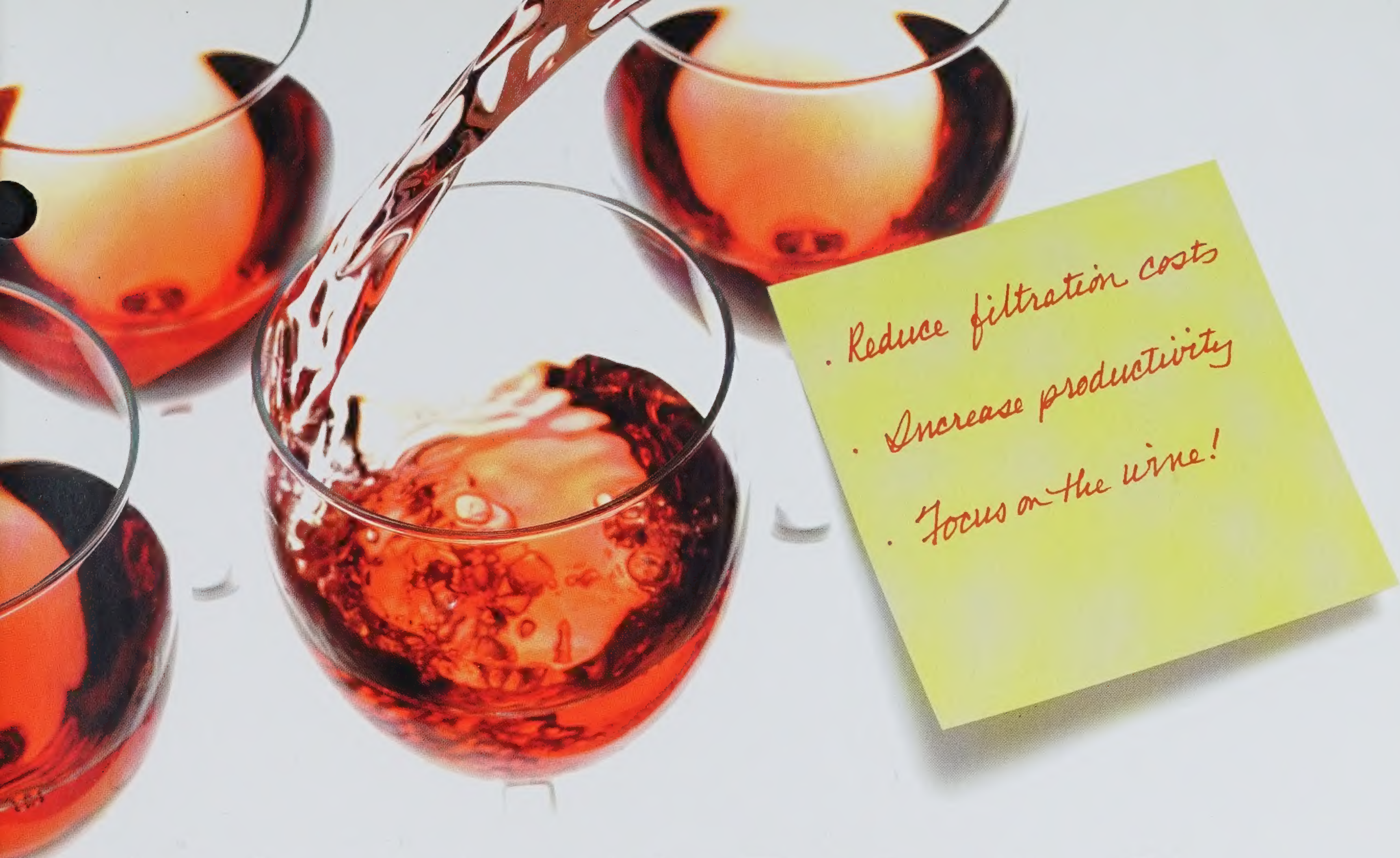

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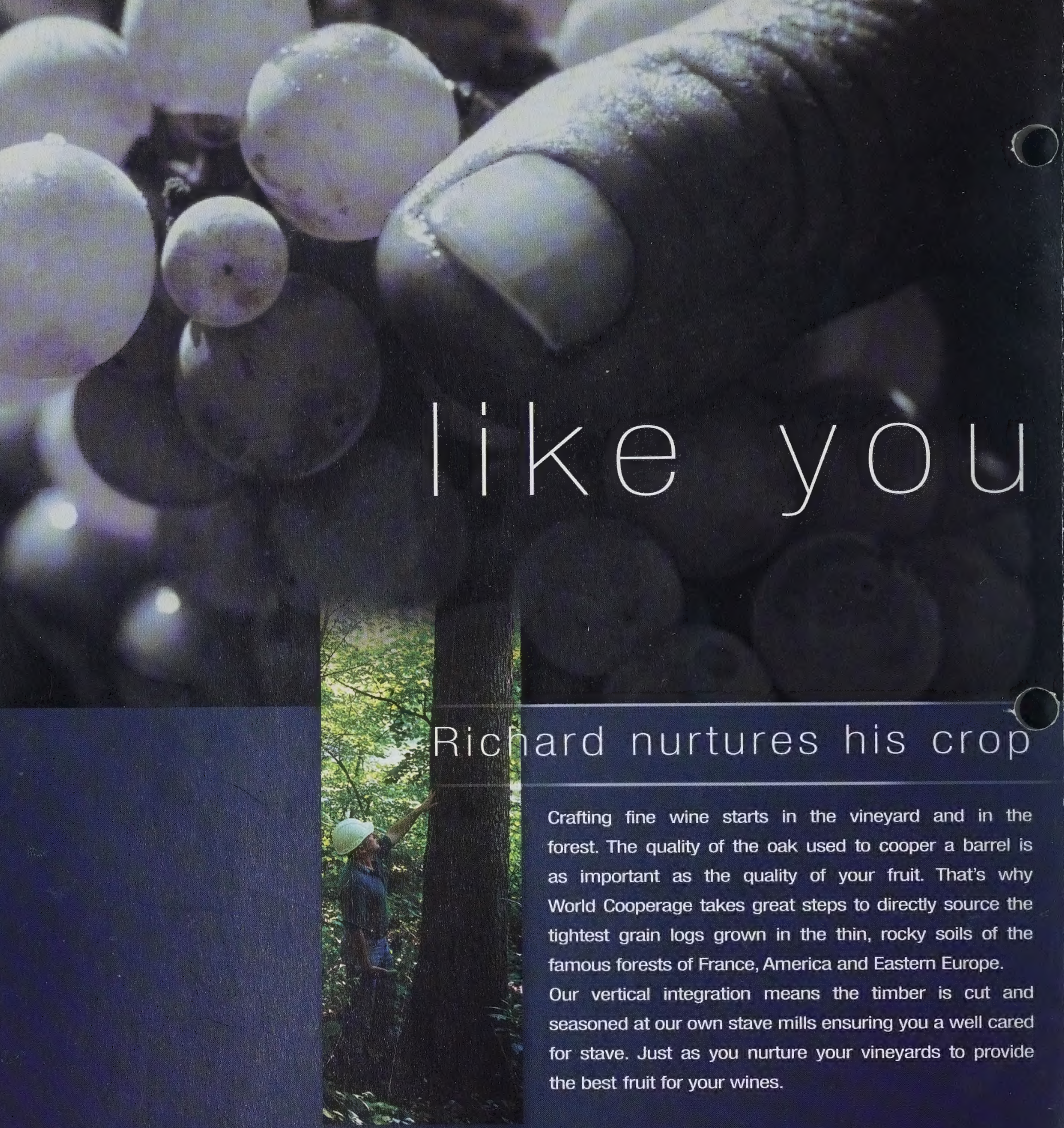

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